Featuring:
CHICAGO TOOL SHOW, March 19-23

MARCH, 1956

# TOOLING and PRODUCTION

The Magazine of Manufacturing Management

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on Dies Stop Trouble

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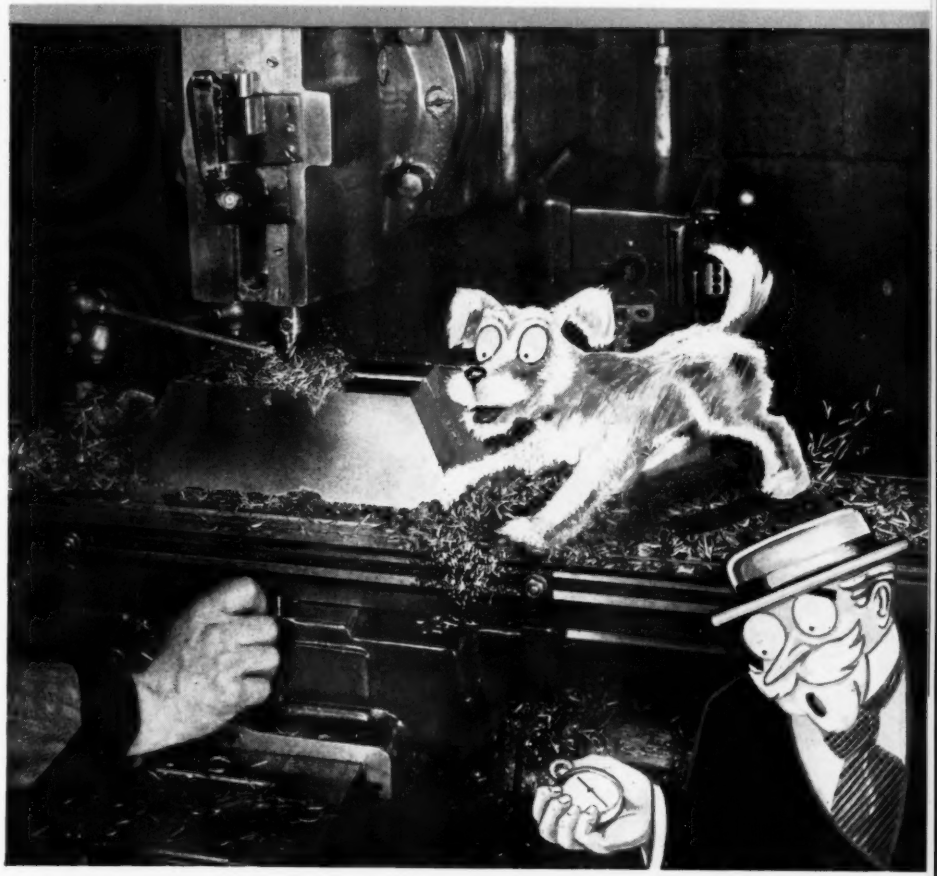
TOOL SHOW PREVIEW

Huebner Publications, Inc.
CLEVELAND 18, OHIO

BPA



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"TRU-LINE" PROFILE DRESSING TOOLS

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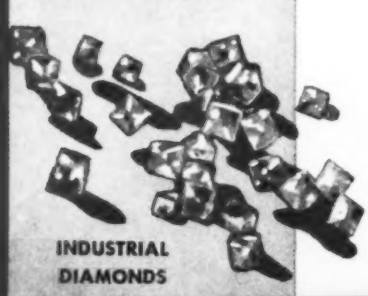
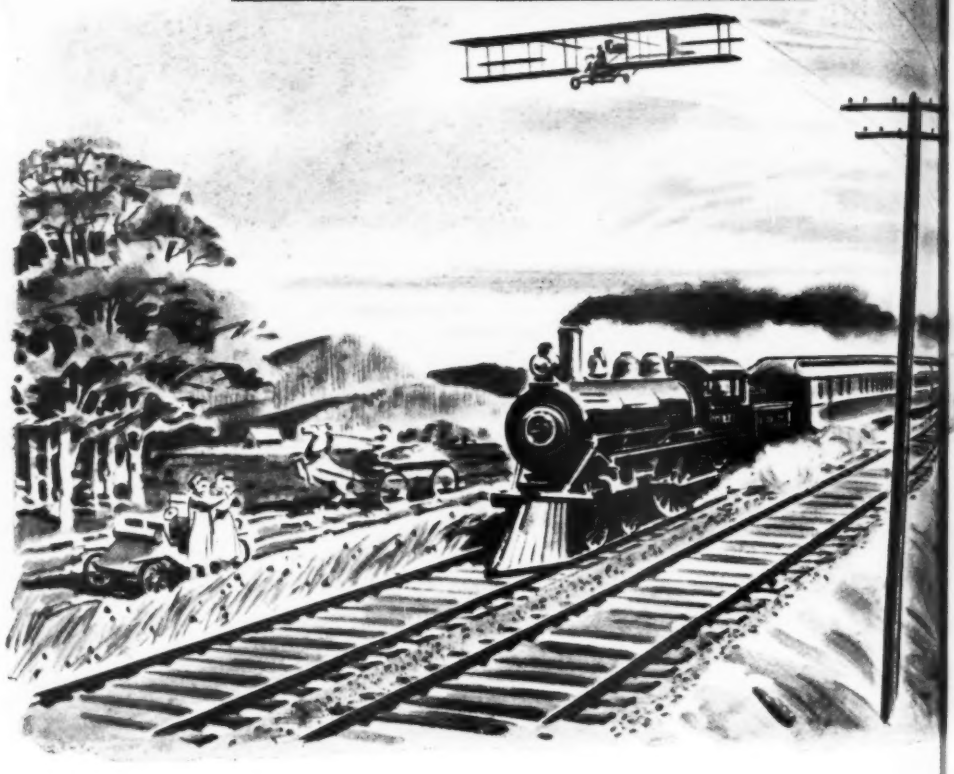
STANDARD DRESSING TOOLS

"TRU-THREAD" THREAD DRESSING TOOLS

DIAMOND GRIT TOOLS FOR THREAD DRESSING



INDUSTRIAL DIAMONDS



# man on the wing

Great things were happening in aviation 46 years ago when we launched the idea of scientifically selected industrial diamonds and set up our little factory to make the diamond tools that were to be so vital to aviation.

Louis Bleriot had won $5,000 offered by London Daily Mail for the first airplane flight across the English Channel. Piloting his 24 H.P., 450 pound monoplane to the dizzy height of 250 feet, he had spanned the 21 miles of open water in 37 minutes. The challenge echoed across the Atlantic and 1910 saw a brilliant parade of dramatic "firsts."

Glenn Curtis won $10,000 offered by New York World in a 150 mile race with a train. Charlie Hamilton won $10,000 offered by New York and Philadelphia newspapers for flying a round trip between those cities in one day. Walt Brookins won $5,000 offered by Atlantic City Aero Club for reaching a height of one mile.

Ely took off from the deck of a cruiser and flew two miles to Norfolk in the first ship take-off flight. Phil Parmalee got $5,000 for flying five bolts of silk from Dayton to Columbus, Ohio, in a store publicity stunt—the first merchandise shipped by air.

*Engineered Diamond Tools** were also a "first" in those early years but their dramatic moment came when war brought critical need for speed and precision in engine production. Then they proved abundantly that nothing cuts like a diamond and that no diamond tool performs like one that is engineered to its job.

**Engineered Diamond Tools* means diamond tools *engineered* to the job and *guaranteed* to do it.

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## about the finest general ~~purpose~~ production milling machines?

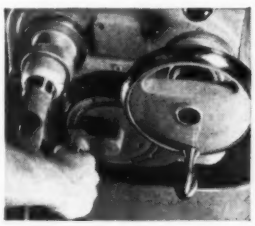
CINCINNATI ML and MI Milling Machines always were considered the finest equipment for toolroom work. Now they're better than ever before, and in addition, plain and vertical machines are available with or without automatic table cycles. And for a little more, automatic cycle machines can be equipped with automatic spindle stop. There you have the story in a nutshell.

Size, style and automatic features are related in the following manner:

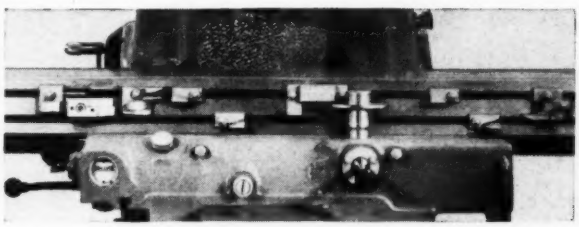
New Nos. 2ML and 2MI Plain; built as toolroom millers, or as production millers with no loss of versatility. New Nos. 2ML and 2MI Universal; fine toolroom millers equipped with a new design Cincinnati Dividing Head (no automatic cycle). New No. 2MI Vertical; a toolroom miller, or production miller with no loss of versatility.

Three Cincinnati features of value in lowering your costs are illustrated here. Of course, there are many more, all of which are outlined in the new CINCINNATI 2ML and 2MI catalog, No. M-1916. Write for a copy, or telephone our nearest agent or office.

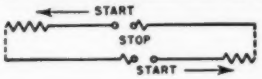
**THE CINCINNATI MILLING MACHINE CO.**
**CINCINNATI 9, OHIO**



A crank-type control at front of knee, makes selection of feeds quick and easy.



Automatic reciprocal milling setups, with center safety stop, may be assigned to Automatic Cycle Machines. That's because automatic backlash eliminator is a standard feature



Enclosed electrical controls. Individual motor for feed drive.

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# TOOLING and PRODUCTION

The Magazine of Manufacturing Management

formerly Tool-Die-Machine PROGRESS 1934-1941
TOOL & DIE JOURNAL 1941-1951

*George J. Huebner, Founder*

VOL. XXI—No. 12 MARCH, 1956


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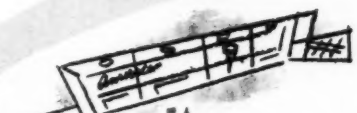
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**To be sure you get all of these American standard features use American drill jig bushings.**

Double ground lead for easy pressing into the jig. Radius into the hole — to prevent tool hang-up, wear and breakage.
Two way undercut under the head to insure squareness to the jig.
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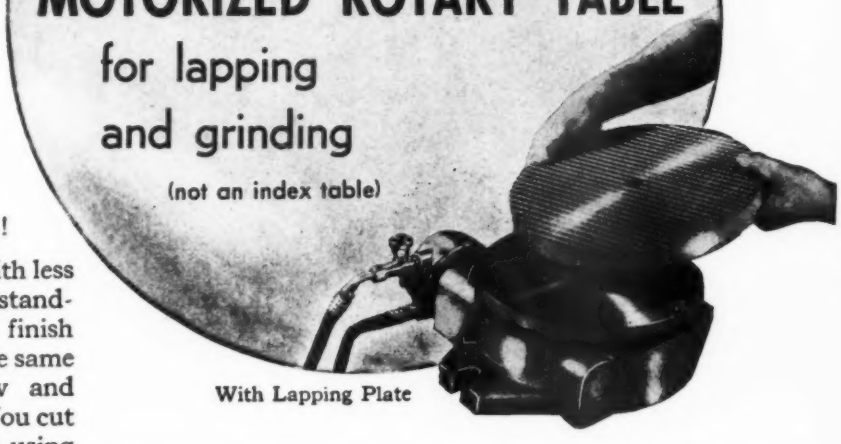
With Permanent Magnetic Chuck

# NEW Vulcan MOTORIZED ROTARY TABLE

## for lapping and grinding

(not an index table)



With Lapping Plate

**FASTER**
circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6″ and 10″ in diameter.

**Work clamped to motorized table, mounted on sine plate. Surface grinder application.**

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6″ and 10″ table, lapping plates of 12″ and 16″ are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. *Write for circular.*

***Major Vulcan Services***

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

**VULCAN TOOL CO.**

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CIRCLE INFORM-A-GRAM KEY NO. 6

# REPORT ON SOVIET INDUSTRY

*by Dr. W. H. Brandt*
Engineering Manager
WESTERN ELECTRIC CORPORATION
Pittsburgh, Pa.

***In December, 1955, N. L. Bean of the Ford Motor Company, Dr. A. C. Hall of Bendix and myself had the unusual opportunity to visit the Soviet Union for the purpose of studying automation there. The trip originated through a request of the Soviet Union to send three engineers to the U. S. to visit a machine tool show in Chicago and to visit a number of plants here. In return they offered the opportunity to send an equal number of engineers to the U.S.S.R.***

***We were regarded and treated as guests of the Soviet Government. However, we were not acting in an official government capacity during our visit as the trips were financed by our representative companies and there has been no restriction placed on our giving out information on what we saw and heard.***

***During the two weeks we spent in the Soviet Union we made 12 actual visits — 7 to manufacturing plants, 4 to research or development institutes, and a round-up conference visit to the Soviet Ministry of Machinery and Instrument Building.***

WE LEFT IDLEWILD Airport on December 4 for London. From London we flew to Copenhagen, then Stockholm, and Helsinki. At this point we took a Russian Aeroflot airplane to Leningrad and from there we flew on to Moscow.

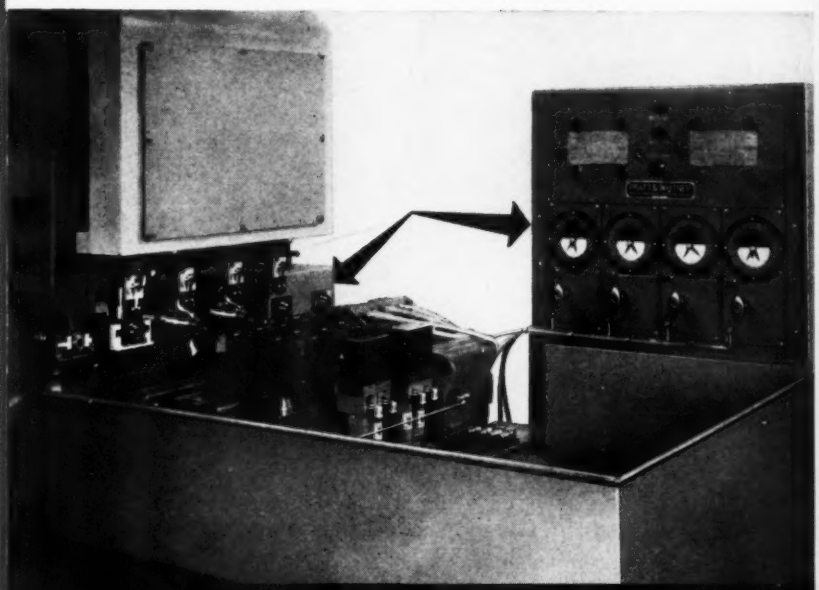
We were met at the Moscow airport Dec. 7 by Jack Armitage of the American Embassy and by Mr. Khodarkov from Intourist. Intourist is the Russian agency which arranges travel plans for everyone in the Soviet Union. They work on a per diem and furnish all services—interpreters, transportation, meals and lodging.

The next morning (Dec. 8) we started off by calling on Mr. Bulgakov, head of the Machine Building Division of the Ministry of Machine Tool and Instrument Manufacture. At this meeting we arranged our future schedule and this schedule was held to throughout the trip with a few minor exceptions. Bulgakov accompanied us on all of our travels in the Soviet Union.

*. . . Continued on Page 12*



HERE'S HOW
THE NEW BRITAIN MACHINE COMPANY
PUTS P&W AUTOMATION GAGING TO WORK



Applied to a New Britain-Gridley Automatic Dual Boring Machine, Pratt & Whitney AUTOMATION GAGING provides in-process gaging plus "feed-back" control for automatic tool resetting.

The results: *Far greater accuracy* with a tolerance of .0003" constantly maintained in regular production. *Very high output* – machining internal and external diameters and facing at a rate of 120 pieces per hour – because down time for checking parts and adjusting the machine is eliminated. *Lower production costs* – thanks to *fully* automatic operation and fewer rejects.

You've *heard* about Automation . . . THIS IS IT . . . proved, practical and ready to go to work for you right now. So write West Hartford, outlining your production problems, and let P&W Automation Gaging Engineers help you produce more accurately, more profitably . . . automatically.

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CIRCLE INFORM-A-GRAM KEY NO. 7

# R-B Strippers Cut Costs

## RUBBER STRIPPER

Stripping with R-B rubber strippers or R-B rubber covered spring strippers eliminates costly metal strippers. Both types of R-B strippers serve the same purpose—rubber strippers are used with smaller punches having shank diameters up to and including 5/8"; rubber covered spring strippers are recommended for punch shank diameters larger than 5/8". Use R-B strippers—to save the cost of making strippers—to substantially reduce installation time—for reduced maintenance.

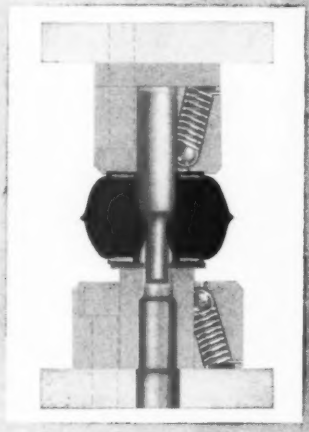
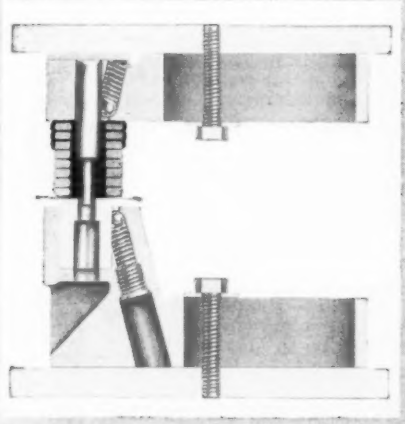


Illustration above shows rubber stripper on punch shank. In this type of application R-B strippers are held to punch shank by friction.

## RUBBER COVERED SPRING STRIPPER

To the right is a cross section illustration showing how rubber covered spring strippers (also rubber strippers) are used with R-B Flex-Mount retainers.



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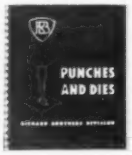


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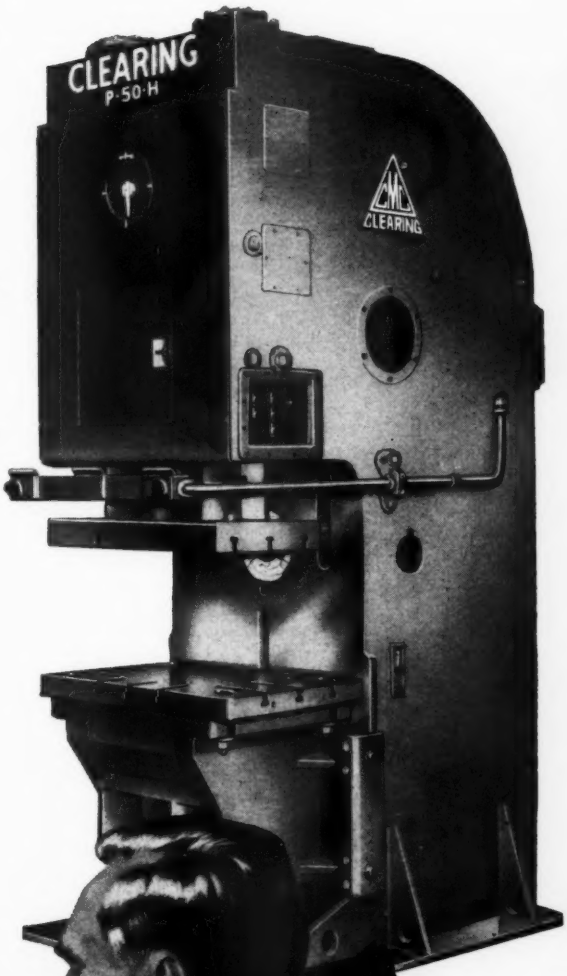
# Simplify PRESS LINE LAYOUT,

## BOOST PROFITS WITH THE CLEARING P-50

The Clearing P-50—a brand new idea in metalworking presses—may be able to solve some problems in your shop. First of all, the P-50 is designed for complete versatility. It can do practically any job in its capacity range. Its adjustable table will provide the right die space for both high and low dies. Remove the table completely for horn press operations.

Put it anywhere in your press line to perform follow-up operations or tool it up for a long run blanking or forming job. The P-50 is built to give top production in either spot.

The P-50 is designed for simple portability and installation. Its enclosed design means that if it will fit into a spot it can be operated there. Gearing and flywheel are built into the frame; so are controls and die space lighting. Simply connect your air line and power; the P-50 is ready to go. If your production setup can use a utility press the P-50 will pay for itself in convenience and time saved. Find out more about it. Write or call Clearing for more information.




*This completely self-contained P-50 features fully enclosed design and built-in controls. This speedy machine (single strokes at 80% of rated strokes per minute) can be moved anywhere in the shop and put into operation in a matter of minutes.*

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CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences. ***Available from Miller at no extra cost.***

The HARD CHROME PLATING over the case-hardened rods protects against scratch-damage and rust. ***Available from Miller at no extra cost.***

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"TEFLON" Rod Wipers and "TEFLON" Hydraulic Piston Rod Seals withstand temperatures from—100°F. to plus 500°F. They are impervious to practically all known chemicals, including the fire-resistant, special, and standard hydraulic fluids in current use. ***Available from Miller at no extra cost.***

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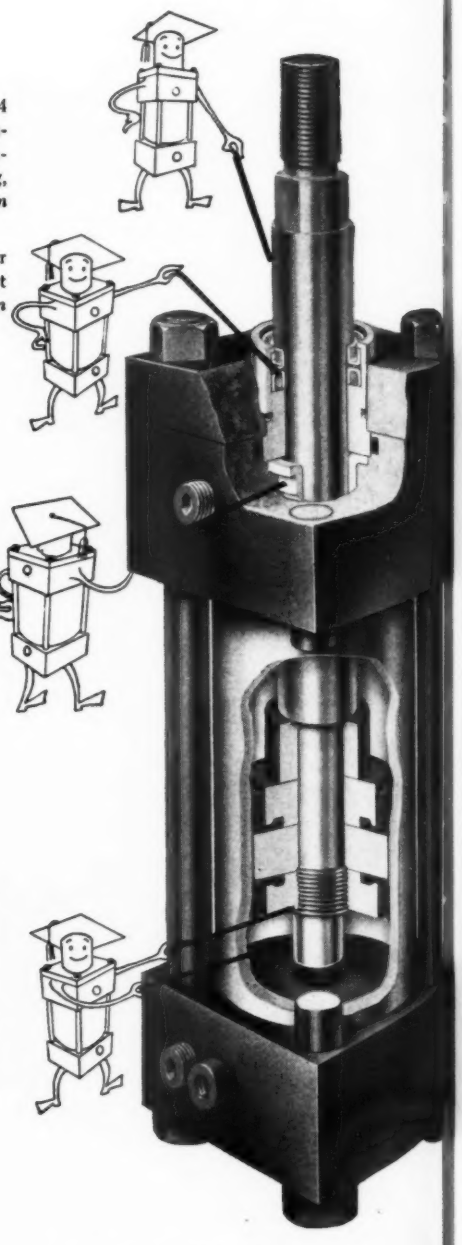
Highest quality Black Ferric Oxide Finish provides rust protection in air cylinder operation and on all cylinders during shipping and installation.

Cylinder heads, caps, mountings, pistons, followers, tie rods, and the unplated portions of the piston rods have this finish ***at no extra cost on all Miller cylinders.*** (This finish not recommended for water service)



*You may wish to route this entire page to the proper department in your company, by using this handy form. Additional copies on request.* →

To (Dept.)_____

"On all our future cylinder requirements, please specify the above quality features."

Signed_____

Title_____

**See These New Features on Miller Cylinders at Miller**

**BOOTH #429**

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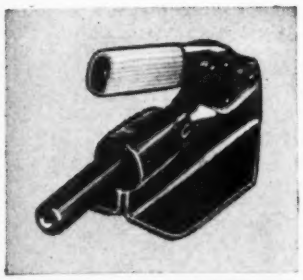

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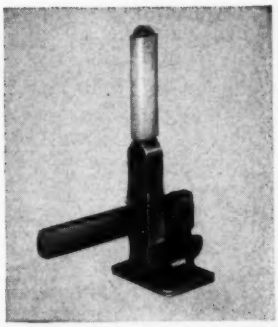

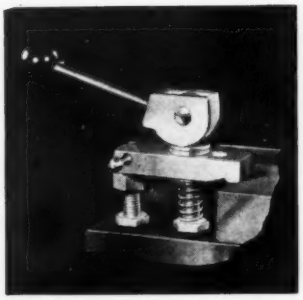

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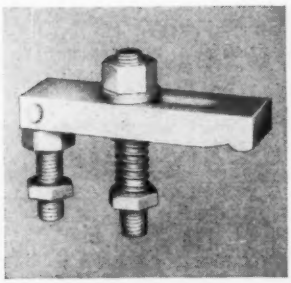

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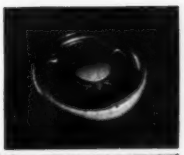
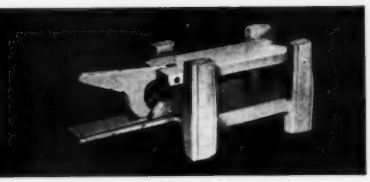


## LEAF JIGS



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. . . Report from Page 7

That afternoon we visited a machine tool plant officially called "The Machine Building Plant named for Ordzhonikidze." It started operation in 1932, largely with foreign equipment. Many of the machines in use when we visited were of foreign manufacture and many were old. I noticed one large Carleton boring machine. Much of the equipment has not been modernized since that time, although in places the operations look quite good.

This plant has an area of 25,000 sq. meters; it employs 3,500 workers, including 450 engineers, 300 of whom have technical degrees.

Special purpose machines, automatic machines, boring machines up to 150-mm diameter, and hydraulic tracing equipment and grinders are the plant's products and they seem to be good. The equipment is mainly of the medium-heavy to heavy type.

It was the opinion of the team that product per manhour is substantially below American standards. This, incidentally, is true in all of the factories that we visited, although there are a few special spots where very likely the opposite is true.

One of the plant's products, a large boring machine about 8 meters long and 5 meters high, bores to 1200-mm depth and up to 150-mm diameter. Three per month can be produced and the price is 440,000 rubles. A similar machine would probably cost $87,000 in the U. S. Another vertical boring machine has a 1½-meter diameter table and 30 per month can be produced.

After visiting the plant, we chatted, through the interpreter, with the plant's Director Kozichev about automation, trends, etc. He stressed the importance of automation from the standpoint of the good of the worker. This is a favorite theme with all plant directors in the Soviet Union, but actual evidence in the factories does not indicate as much concern with worker fatigue and with working conditions as does the conversation.

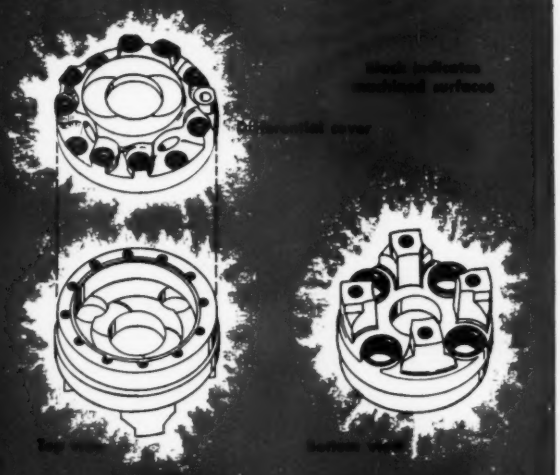
On the morning of December 9 we visited the Institute of Precision Mechanics and Calculating Technology. Here we saw one of the more impressive achievements of Soviet technology, the BESM computer, a high speed action electronic machine. It is intended for solving scientific problems and therefore can not properly be considered as competitive with the IBM 701 or IBM 704. It is a three-address unit with a floating decimal point. It carries five bits of information for command purposes and numbers up to 11 digits. It was stated that the machine is at least twice as fast as the IBM 701 in certain types of operations.

I will not discuss this computer in

. . . Continued on Page 14

# CUSTOMER SPECIFIED

Customer specified a multi-purpose production machine to perform 12 operations in sequence on both the main casting as well as the cover of a differential housing.



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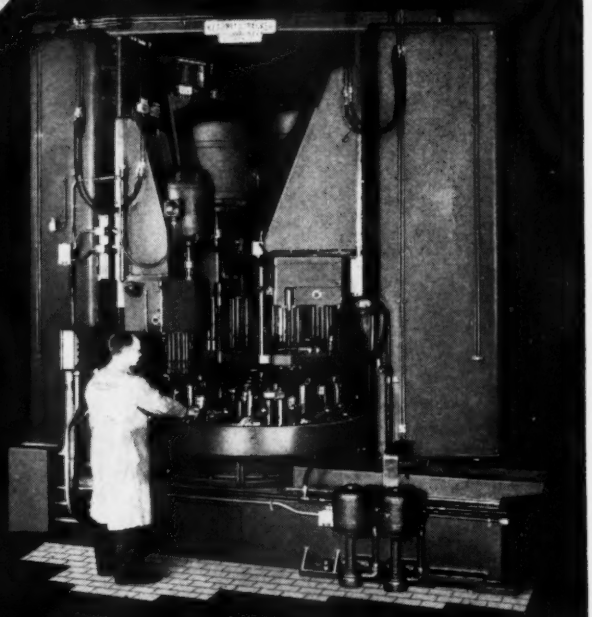

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Machine features rugged columns which provide rigid support . . . and exacting accuracy. Five fixtures, each holding three workpieces, are mounted on a standard Kearney & Trecker 60" rotary index table. Machine employs three vertical drilling heads, each counterweighted. First head has 48 spindles and performs drilling, counterboring, flat bottom drilling and chamfering. Second head carries 28 spindles and handles spotfacing, reaming, boring and trepanning operations while head No. 3 with 12 spindles does tapping operations.

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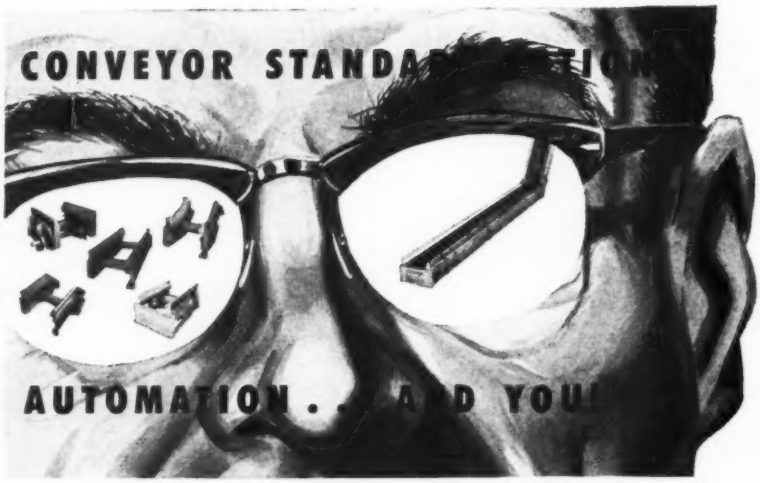


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CIRCLE INFORM-A-GRAM KEY NO. 14

. . . Report from Page 12

great detail, but I will comment that they seem to have made rather good use of memory devices. The BESM contains four distinct memories. One uses cathode tubes and is the memory used by the machine in its actual computation. It has a diode memory in which are stored the constants of the problem. In addition, it employs two types of magnetic memory, five drums and four tapes. Problems are broken down into segments that can be handled by the working memory of the machine. The problem is set up and the machine takes information from the tapes or drums, works out a section of the problem and then sends the answers back to the drums or tapes. The next section of the problem is then set up. They seem to have arrived at rather optimum use of these various types of memory devices in that they have some with rapid access, larger memories with somewhat slower access, and still larger ones with slower access still.

The unit operates 24 hours per day all of the time. Test time on the machine is 20% of this but error losses run about 8%, so useful time is 72% of the total. They figure this machine as being the equivalent of 12,000 human operators.

That afternoon we visited the Krasney Proletariat, machine tool manufacturing plant, where screw cutting machines, vertical spindle machines, 6-spindle semi-automatic lathes, crank shaft machines and cam shaft machines are manufactured. Here, they have an assembly line for making semi-automatic lathes, crank shaft machines and cam shaft machines. They also have an assembly line for making semi-automatic turret lathes with 6 positions per turret. Capacity of the line is stated as 54 per day. This is probably a fair statement of capacity although we are quite sure they were not making 54 per day at the time we were there.

The plant maintains an extensive laboratory containing 50 machines that are used entirely for experimental purposes. Here, they were using ceramic tools, but it was my impression that their use of these tools was confined entirely to laboratory experimentation. They operated the tools at a speed of 900 meters per minute and obtained about an 80 micro-inch finish when cutting at this speed.

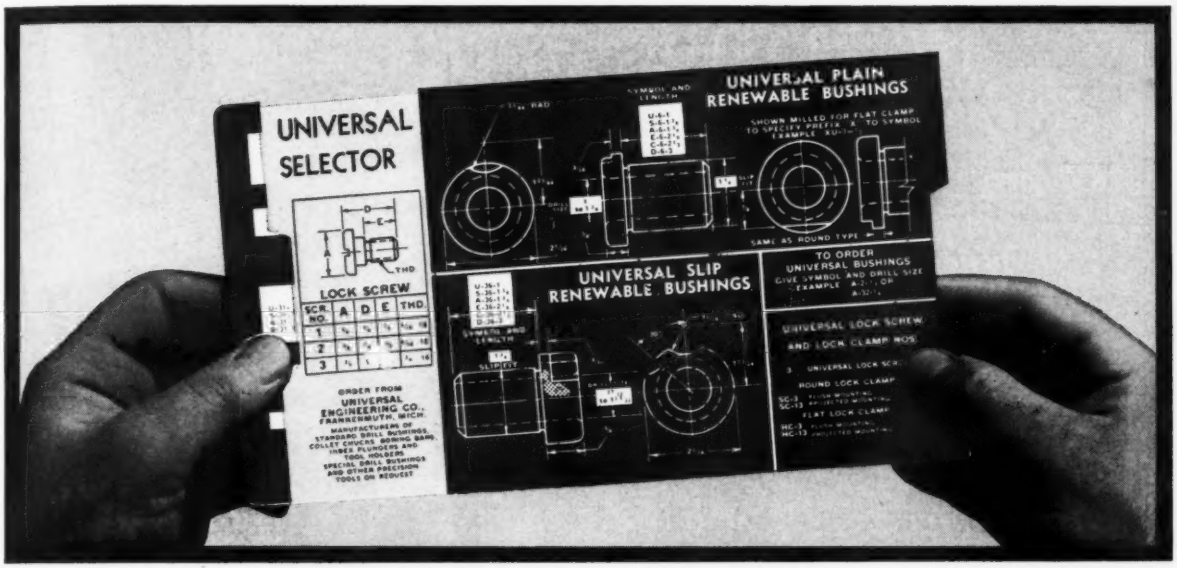
### Cutting Tool Research

The Experimental Scientific Research Institute for Metal Cutting Machine Tools (ENIMS) works entirely for the machine tool industry and comes under the Ministry of Machine Tool and Instrument Building. The organization's activities fall under three main groups: Calculations

. . . Continued on Page 17

# HOW THE UNIVERSAL DRILL BUSHING SLIDE CHART SIMPLIFIES JIG DESIGN

**new plastic, pocket-size calculator gives all engineering data for the selection of all types and sizes of drill jig bushings up to 1¾" drill size**


UNIVERSAL SELECTOR
LOCK SCREW
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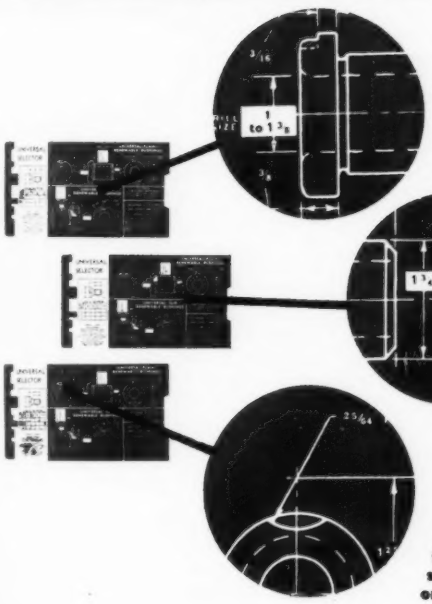


**The SELECTOR is divided into four areas, one for each of the four types of bushings. The example shown here is for the plain renewable. Using this area, you move the slide until the correct drill size appears in the drill-size window.**

**Once the drill size is set up on the SELECTOR, all other factors now appear in the windows. This section, for example (shown actual size) shows correct bushing O.D. and dimension from center to flat for clamp.**

**This section shows the radius for lock screw. Every factor you need for drill bushing jig design as well as for ordering the correct bushing to fit that design is shown correctly, exactly, and at a glance on the SELECTOR.**

**A new service to regular users of drill jig bushings is this extremely practical plastic Selector slide-chart. When designing jigs, you will save many hours, and be certain of your accuracy, with the SELECTOR. It represents the result of six years experimentation and research by Universal Engineering Co. If you are an engineer specifying bushings and do not have one of these slide calculators—you can have one for your own design work by simply requesting it on your company letterhead. Don't wait—do it today!**

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CIRCLE INFORM-A-GRAM KEY NO. 16

. . . Report from Page 14

of obsolescence; rigidity of tools, which probably means general mechanical design; general design problems.

Under General Design, there are three departments — technology, metallurgical, and design. The general task of the ENIMS is to improve machine tools and to assist in applying these improvements in the machine tool industry. They also serve as a general clearing house for technical information.

Machine tools are planned three to five years ahead, working largely from Institute information, but also incorporating information from the industries concerned and information gleaned from the technical press within and without the country.

Individual machine tool plants also design their own equipment. However, any design must be approved by ENIMS before the plant can go ahead with production. ENIMS considers that its first task is to keep industries from building new units that do not incorporate the latest improvements. In case of disagreement between ENIMS and the industry involved, the factory is permitted to defend its position and in these cases the Ministry of Machine Tool and Instrument Building is the final judge. ENIMS coordinates planning among factories to avoid duplication and foster mutual assistance.

There are also 10 and 15-year plans, but these are of only a very general nature. As part of their present 10 and 15-year planning, they plan further use of completely automatic production lines. By an automatic production line, they mean groups of tools connected with each other from one machine to the other. (An automatic production line in this terminology compares quite closely with a transfer machine.)

The institute strives for balanced designs, taking into account the speed of the machine, capacity of the machine, automation (including future possibilities), continuous cutting (use factor), and optimum production of the machine over its lifetime.

An important program of the institute is one on chip control. Sometimes chip control is good; sometimes not. We observed in Soviet factories that in many turning operations they are producing long spirals that make the scrap handling problem difficult. On the other hand, in the ball bearing plant, they are producing small well broken chips that are disposed of continuously by the machine to a chip conveyor in the floor.

They do not hire their engineering staff directly from the colleges, but insist on three years' factory ex-

. . . Continued on Page 28


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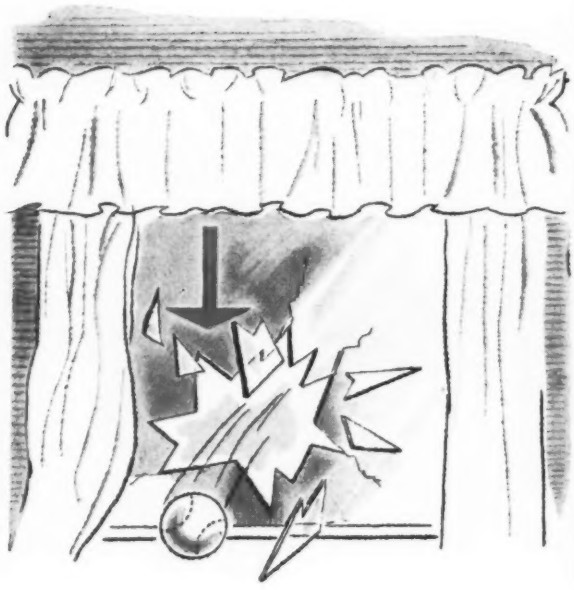
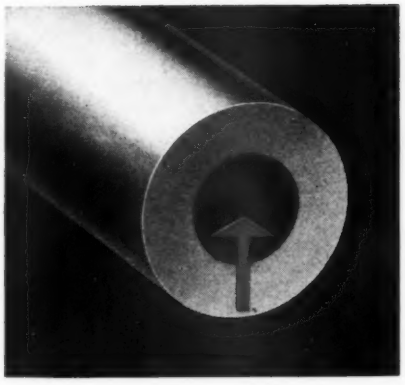


a hole here means work...



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***ALL NEW*** wider spaced, longer, narrower gibs

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***ALL NEW*** precision, hardened, longer-wearing gears

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It's years ahead of any OBI ever built. It's an industrial revolution all by itself. No other press, in modern times, embraces so many "All-New" features.

Gone are exposed, overhanging gears, flywheel and other mechanisms. Gone is excessive and damaging crankshaft deflection. Here to stay are: Full support to wide dies. Greater resistance to off-center loading. Accurate alignment of slide, with minimized tendency to cock. Substantially increased die life. Longer lasting, hardened gears. Smoother, safer press performance. Smaller floorspace requirements.

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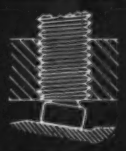
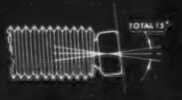


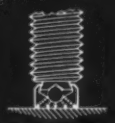
- Screw torque absorbed by pad—not the work piece.

- Unique ball-joint construction provides extremely smooth angle adjustment and rotation of pad.




- Pad swivels 7½° each side of center line in all directions.

- Large flat pad area assures tighter clamping.



- Conical seat distributes clamping pressure uniformly.
- Eliminates costly, custom-made swivel pads.
- Du-Lite finish for rust proofing.
- Made from heat-treated, alloy steel to last for years.

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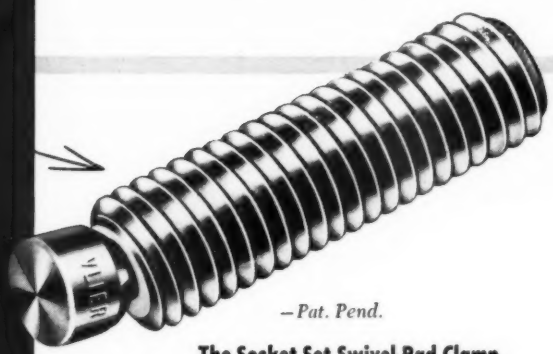
**The new Knurled Head Swivel-Pad Clamp**

Use when finger-type clamping is sufficient. Wide knurled-head gives good gripping; assures fast screw run-in. Available in 4 different screw diameters; 1½" and 2" screw lengths.



—Pat. Pend.

**The Socket Set Swivel-Pad Clamp**

Use wherever maximum rigidity is necessary, or where space is limited. Available in 7 screw diameters; various lengths.

**Write for free 1956 Vlier catalog.**

**Other Vlier products**

Spring Plungers | Spring Stops | Toggle Pads | Fixture Keys | Torque Thumb Screws

VLIER ENGINEERING INCORPORATED

8900 Santa Monica Blvd., Los Angeles 46, California

*Distributors located in major U.S. and Canadian industrial areas.*

CIRCLE INFORM-A-GRAM KEY NO. 22

# USE OF "HARTFORD SPECIAL" DRILL UNITS

## INCREASES PRODUCTIVITY 211.7%

## CUTS COST PER PART 32%

Processing cast iron pivot yokes for a major appliance manufacturer posed a problem for Woodruff & Edwards. The major headaches were:

1. The part was being milled, drilled, faced and turned on four separate machines.
2. Production per 8 hour shift was 600 parts, but required more than two men who consumed 22 manhours.
3. The scrap figure was very high.
4. Cost per part was high.
5. Loss and delay in handling were high.

Woodruff & Edwards solved the problem by designing and building their own production machine around four standard "Hartford Special" Air-Hydraulic Drill Units. The successful results:

1. Now in one machine, four holes are drilled, two spotfaced, one boss hollow milled, spotfaced and chamfered, another boss chamfered and a shoulder spotfaced and chamfered.
2. Production per shift is still 600 parts but requires only 8 manhours, an increase in productivity of 211.7%.
3. ***Not one yoke in over 100,000*** delivered to the customer ***has been rejected.***
4. A saving of 32% per part has been realized, including a recent rise in cost of material!
5. Parts are now handled by one man and are shipped directly to the assembly line of the customer with a minimum of delay.

PETE LENART, Dept. Foreman, says, "This is a very efficient operation with practically no machine maintenance. The setup is extremely compact because the Hartford Drill Units are space saving, and easy to install, too."

RICHARD HAMPEL, a Supt. of Woodruff & Edwards who helped design the machine says, "We have achieved a fine record on this job, and the Hartford Drill Units deserve the lion's share of the credit."

***Take a tip from the Woodruff & Edwards story. Let "Hartford Special" Drill Units and other standard components bring higher production at lower cost to your plant.***

MACHINE TOOL DIVISION

**THE HARTFORD SPECIAL MACHINERY CO.**

**292 HOMESTEAD AVE., HARTFORD 12, CONN.**

HARTFORD *Special*

CIRCLE INFORM-A-GRAM KEY NO. 23

# BURGMASTER® AUTOMATIC HYDRAULIC TURRET DRILLS

## with Power Indexing produce a "higher level of quality" at Bendix Aviation Corp., Bendix Products Div., South Bend

They have this to say at Bendix, South Bend where 20 Burgmaster 6 spindle 2BH turret drills are effectively performing numerous secondary operations on aircraft parts—

"The work performed on the Burgmaster 2BH Models was previously run on 6 spindle hand-fed upright drill presses. The benefits derived over the old method of machining are:

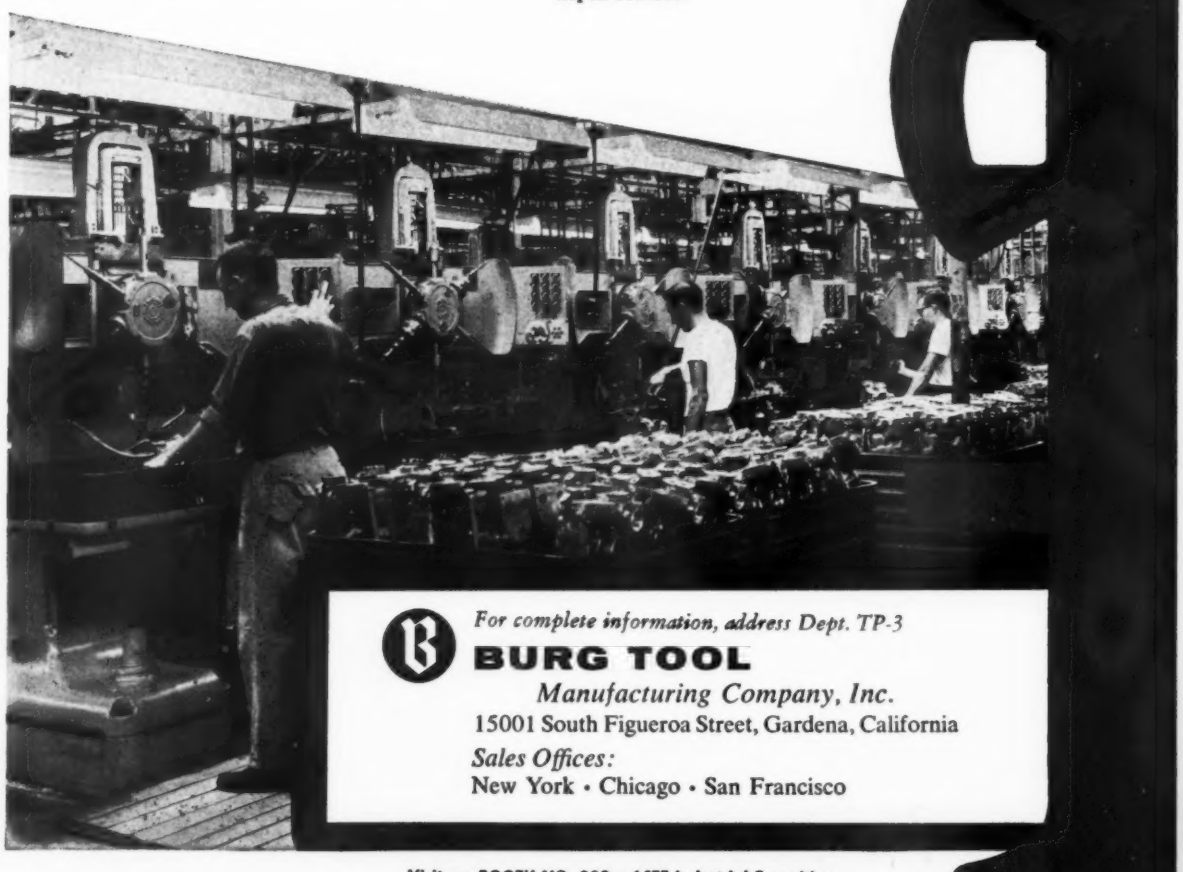
1 *With the drill fixture clamped in alignment under the spindle, a higher level of quality can be maintained and repair work has dropped to a minimum.*

2 *Operator performs work with less fatigue.*

3 *The uniform hydraulic feed enables us to produce better finishes and size."*

Machine tool users everywhere are experiencing these and additional benefits such as: simplified fixturing, extreme versatility—jobs formerly done on turret lathes, chuckers, hand screw machines can be done with ease on the Burgmaster; low initial cost, low maintenance, little floor space required. They are finding that here, in one highly versatile machine, drilling, reaming, counterboring, countersinking, spotfacing, tapping, O.D. threading and many other operations can be accomplished with more accuracy—with one operator.

Automatic hydraulic Burgmasters (6 and 8 spindle models) feature skip indexing, automatic cycling and infinitely variable pre-selective feeds. All models (including the 6 spindle manuals) provide power indexing, pre-selective spindle speeds and very close pre-selective depth control.



*For complete information, address Dept. TP-3*

**BURG TOOL**

*Manufacturing Company, Inc.*

15001 South Figueroa Street, Gardena, California

*Sales Offices:*

New York • Chicago • San Francisco

**Visit our BOOTH NO. 389 • ASTE Industrial Exposition**
**CHICAGO International Amphitheatre • March 19-23**

CIRCLE INFORM-A-GRAM KEY NO. 24

# 44% FASTER

## NEW ROTOR D-4 GRINDER

## pays for itself in one month

**JOB:** Grinding edges and holes of flame-cut tube hanger plates with 4" plug wheels.

**FORMERLY:** Used 4500 rpm grinders. Output: 50 pieces per day.

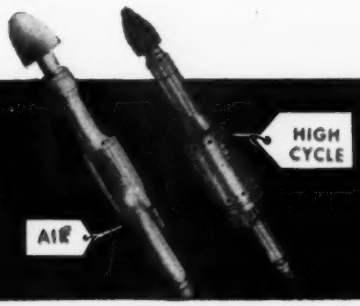
**NOW:** Use new Rotor D-4 8500 rpm Grinders. Output: 72 pieces per day.

**RESULTS:** 44% more output paid off cost of new Rotor Grinders in one month. After that, it's pure savings.

Find out from your nearby Rotor Analyst how *you* can cut costs with the D-4 and other new Rotor portable tools! Ask for a demonstration.

**ASK FOR BULLETIN NO. 43**

THE ROTOR TOOL CO.
CLEVELAND OHIO




CIRCLE INFORM-A-GRAM KEY NO. 25

**SPRING STEEL RING**

9" O.D. x 6¼" I.D. x .091" 50 pieces (100 surfaces) per hr.; .004" stock per side; limits ±.0005"

**CAST IRON END PLATES**

30 pieces (60 surfaces) per hour; ⅛" stock removed each side; limits ± .002"

**ADJUSTING SCREW WASHERS**

Low carbon steel; 200 pieces (200 surfaces) per hour; .025" stock removed; limits ± .001"

**HOT ROLLED STEEL CAMS**

225 pieces (450 surfaces) per hour; 3/32" stock removed each side; limits ± .001"

# NOW! BLANCHARD PRESENTS ANOTHER GREAT NEW GRINDER

## *with Automatic Cycle Control*

This great new Blanchard Surface Grinder performs a variety of jobs with speed, ease and accuracy.

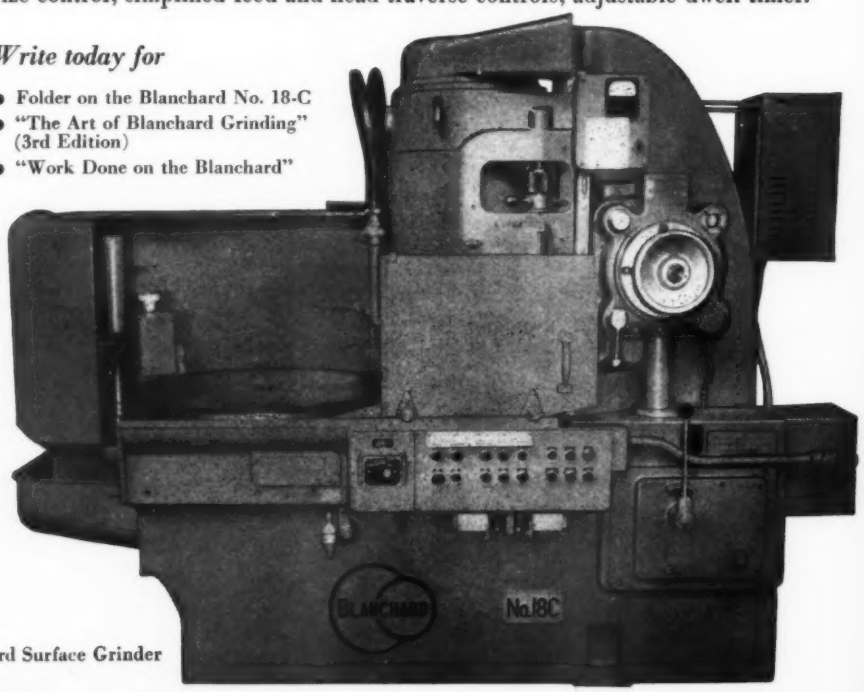
One operator can easily operate two of these No. 18-C grinders under balanced conditions. By using the automatic cycle, he can unload, clean and reload one grinder while the other is grinding.

Here's what the automatic cycle does: moves chuck (30" or 36" dia.) to grinding position and starts it rotating; starts wheel rotation and coolant pump; provides rapid wheel approach to work; engages power down-feed at preset rate; changes to fine feed just before finished size is reached; stops feed when work is to size – "sparks" out; raises wheel head; stops wheel, coolant pump and chuck; moves chuck to loading position – demagnetizes chuck.

This new Blanchard also features: push button selection of manual or cycle operation; size control; simplified feed and head traverse controls; adjustable dwell timer.

*Write today for*

- Folder on the Blanchard No. 18-C
- "The Art of Blanchard Grinding" (3rd Edition)
- "Work Done on the Blanchard"

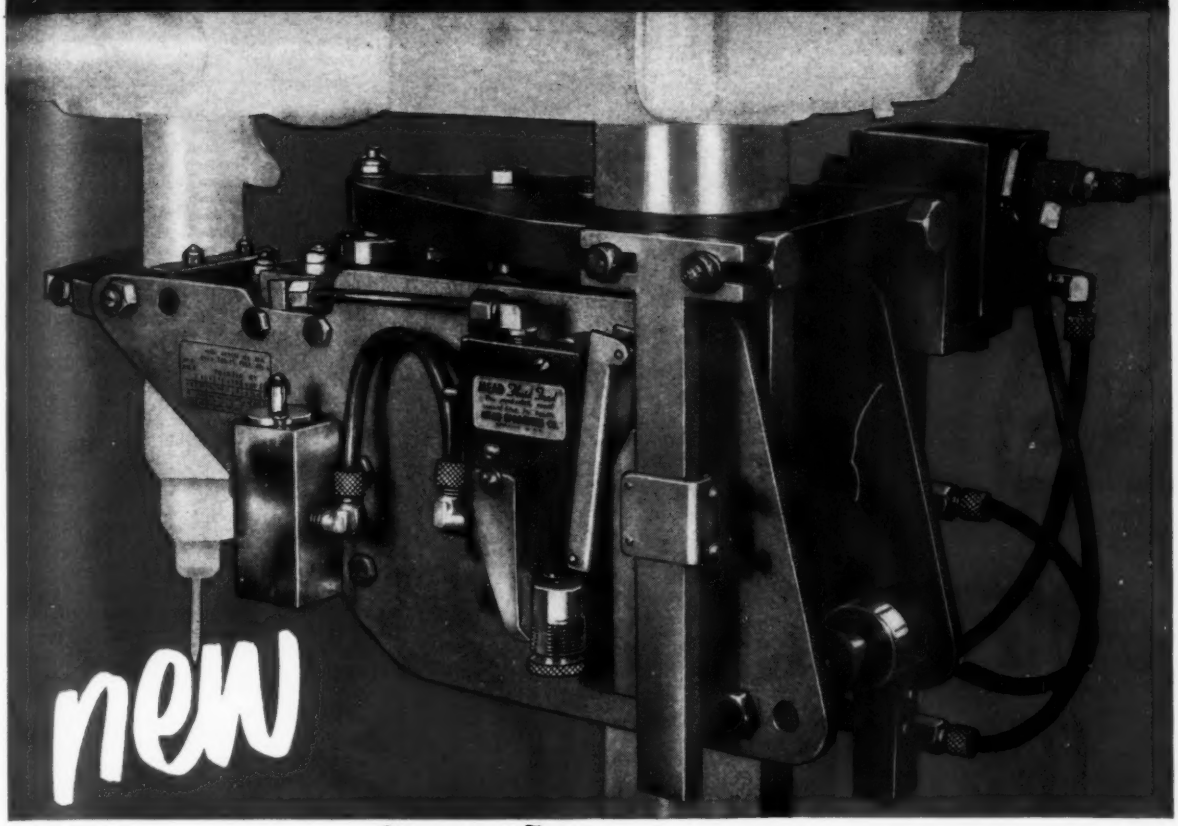



No. 18-C Blanchard Surface Grinder

**THE BLANCHARD MACHINE COMPANY** 64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

CIRCLE INFORM-A-GRAM KEY NO. 26

# Fluid Feed AIR-HYDRAULIC DRILL PRESS FEED!




## with Predictable Speed Control!

***EXCLUSIVE NEW OIL-FLOW PRINCIPLE ADJUSTS RATE OF FEED ACCURATELY FROM 2 INCHES TO 60 INCHES PER MINUTE... Combines Even Steady Hydraulic Feed with Economical, Dependable Air Power!***

*Learn how Mead's exclusive new oil-flow principle provides pre-selection of feed speed accurately from 2 to 60 inches per minute yet is adjustable during operation — how the usual needle valve and air bubble troubles are eliminated—how steady, even hydraulic control combines with economical, dependable air power to give faster, easier, better production.*

**See it working at BOOTH 215 ASTE INDUSTRIAL EXPOSITION Chicago, March 19-23**

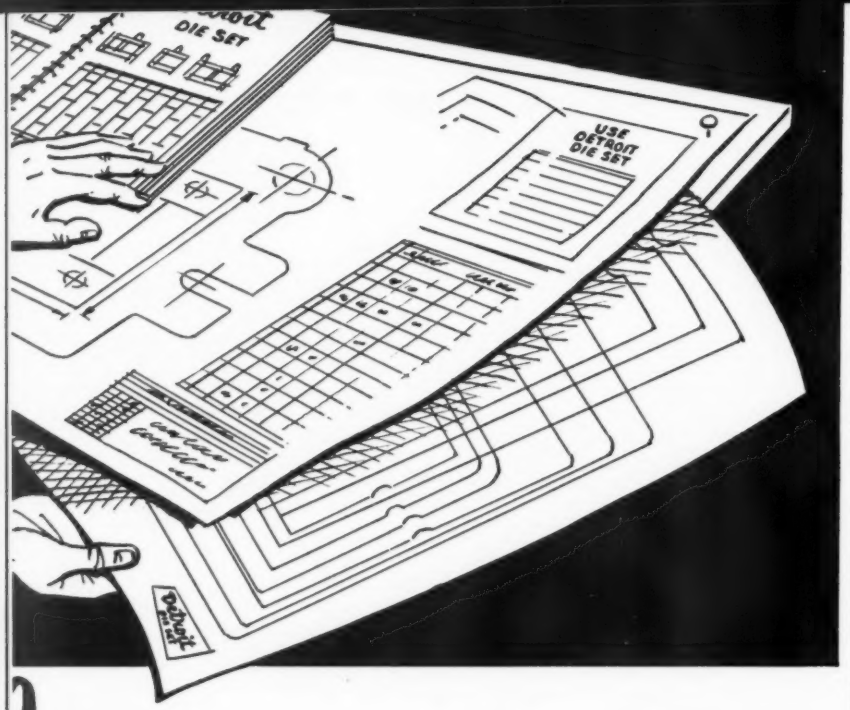
## Write Now!

**It will pay you to write factory or nearest Mead Representative (listed in Thomas' Register) for special 4-page folder plus Catalog of other Mead units suitable for automation with this remarkable new Fluid Feed Air-Hydraulic Drill Press Feed! Write now!**

**PATHFINDER IN AIR POWER AUTOMATION**

**MEAD**
**SPECIALTIES COMPANY**
DEPT. HA-36, 4114 N. Knox Ave., CHICAGO 41, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 27




# ut DIE COST WHERE IT'S IMPORTANT...

## ...BEFORE the design gets off the board

Save die designing time with Detroit Die Set time savers. Easy-to-use catalog puts all needed information *flat* in front of you. Heavy paper die set templets (free on request) quickly determine size—save drafting time. Just slip under layout and trace most economical size for the job.

For more difficult jobs, a Detroit Die Set engineering representative is as near as your phone. He can quickly answer questions about special die sets, bushings, etc.

Start cutting die design cost now. Specify Detroit Die Sets. Available in all sizes and materials. Precision or Commercial tolerances. Stock die sets shipped within 24 hours. Unusually fast service on specials, too.

*Offices in Principal Industrial Centers*

Detroit DIE SET CORPORATION

2895 WEST GRAND BOULEVARD • DETROIT 2, MICHIGAN

. . . Report from Page 17

perience before an engineer can be employed in the institute. Engineers work on fixed wages, plus a bonus. The institute gives prizes for outstanding work. Very outstanding work may qualify for a Stalin prize.

**Patent System**

Russians do have a patent system and any citizen of the U.S.S.R. may apply for a patent. Three or four hundred applications are made each year, I believe, from the institute. About 20 or 30% of the patents granted earn a royalty which is paid to the inventor on the basis of a percentage of the profit resulting from the invention.

There is no limit to the period over which a royalty may be collected. In practice, the useful life of a patent is usually 10 to 15 years. A special government bureau safeguards the rights of inventors.

I saw two patents, one issued in 1951 and one in 1954. The first was numbered approximately 91,000, the second, approximately 97,000, so presumably 2,000 patents per year are granted. I am not certain that this represents the entire output of patents or whether there is a special number series for different fields of technology.

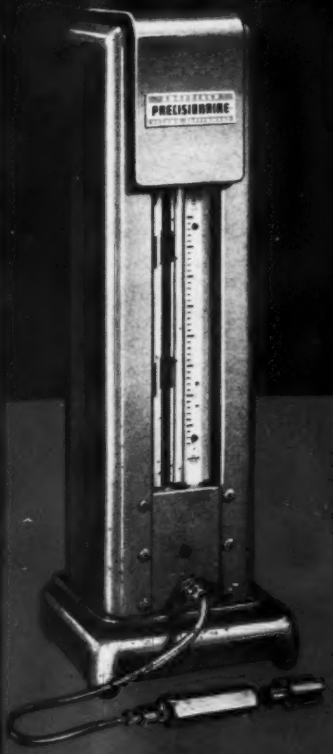
We visited the experimental plant near ENIMS where they manufacture machine tools of advanced design. Here they are building gear-cutting machines producing all types of gears. It is their claim that 80% of these machines are made of standard parts. This claim seemed to us to be somewhat overstated. They also have gear grinding machines which are, in general, semi-automatic; that is, they require an operator, but much of the sequencing of the operation is done by the machine itself. The logic of this sequencing is primarily hydraulic and mechanical.

At the ENIMS, the Soviets are working on electro-erosion (metal removal by electro-spark methods). We asked to see the wave form on the power supply and it was shown to us on the scope, but it was impossible to make out the wave shape. They generally operate at 10 to 20,000 cycles or at power supply and are able to oscillate the tool at a frequency of 100 cycles per second. However, the latter feature seems to be purely experimental and they are not even sure that it results in improved operations.

They use this electro-erosion process for making contoured shapes. The piece exhibited was in the shape of a piston cut in half with the inside of the piston shaped by electro-erosion. They stated that it required an hour to an hour-and-a-half to produce this part using an aluminum tool. The surface ob-

. . . Continued on Page 34

# FREE DEMONSTRATION




# SHEFFIELD Adjustable AIR GAGES

## *for Short Runs and Emergencies*

**SUCH AS:**

- Aircraft manufacturers, subcontractors and job shops having limited production.
- Accidental damage to a vitally needed single purpose gage.
- An unexpected engineering change involving part size.
- A short run of special parts for which no gages have been provided.
- A mistake or failure in ordering the needed single purpose gages.
- Sudden need for process gages at the production machines.

Don't let any of these situations cause costly scrap, delays or embarrassing confusion in inspection, in the shop or in the toolroom. A small investment in the adjustable air gages here illustrated is your best insurance against unpredictable production losses. *The Sheffield Corporation, Div. #600, Dayton 1, Ohio, U.S.A.*

**ADJUSTABLE BALLJET SPINDLE KITS**
1" to 3"

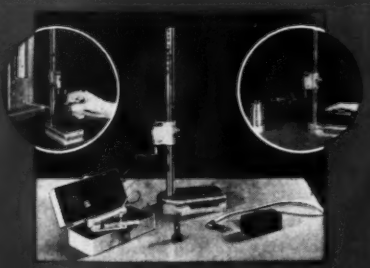
In 5 minutes you can assemble, for precision gaging, a spindle for ANY SIZE hole from 1" to 3". No auxiliary equipment needed except conventional gage blocks—NOT EVEN ONE MASTER SETTING RING.

**ADJUSTABLE AIREBORE GAGE KITS**
3" to 12"

The Airebore Gage can be set precisely to any diameter from 3" to 12" by means of a calibrator and gage blocks. No master rings are needed.

**PLUNJET ADJUSTABLE SNAP GAGES**
0" to 12"

Twelve Plunjet Adjustable Snap Gages cover a gaging range from 0" to 12"—Larger sizes on special order.



**AIRETEST AND PLUNJET STAND**

This stand accommodates an Airetest indicator—also converts to a comparator or height gage by using a Plunjet or dial indicator and anvil.

**SELF-CENTERING ADJUSTABLE SPINDLES**
1/32" to 3"

Four Self-centering Adjustable Spindles cover respectively the ranges of 1/32" to 1/4", 1/8" to 3/8", 3/8" to 1 1/2" and 1 1/2" to 3". All but the smallest can be set with gage blocks.

**STANDARD ADJUSTABLE AIRSNAPS**
1/4" to 5 1/2"

Available in 19 models to cover the range .2500" to 5.500". Up to 3.000" the anvil has an adjustment of 1/4"—above that, 1/2".

MASTER CRAFTSMAN — GOLDEN ANNIVERSARY — HEADQUARTERS

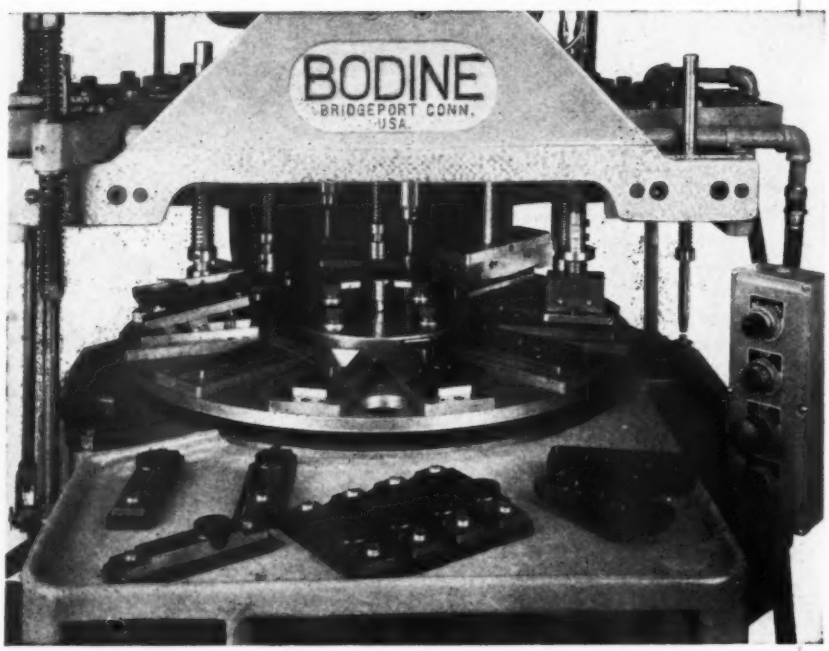
# SHEFFIELD

*manufacture and measurement for mankind*

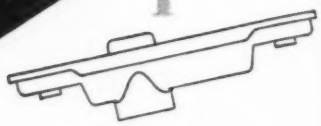
*Call Your Sheffield Representative for a Demonstration in Your Plant*

# Bodine CASE HISTORY NO. 41

**MULTIPLE OPERATIONS . . .**
**MULTIPLE TOOLING . . .**
**METAL AND PLASTIC . . .**
ON ONE VERSATILE MACHINE

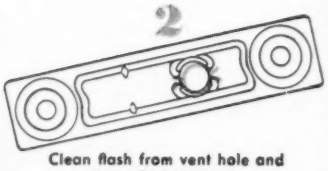



1



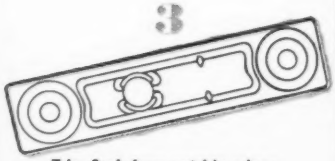
Covers hand-loaded, one piece per stroke.

2



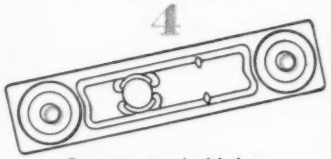
Clean flash from vent hole and slots. Carbide tools.

3



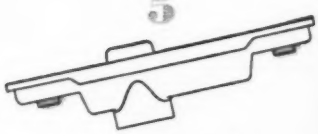
Trim flash from outside edges of cover. Carbide tools.

4



Ream two terminal holes in lead inserts.

5



Hollow-mill two terminals in lead inserts . . . using inverted spindles.

6

AUTO EJECT.

The unusual features of this Bodine tooling lie in the many different types of operations performed in one high-speed cycle, and also in the multiple tooling of the machine to handle many different sizes of these auto battery cell covers, both 6-volt and 12-volt.

Major battery producers now use 15 of these production units. Bodine basic design, as will be seen in the photograph, provides ample room for inclusion of the dies required for trimming operations, as well as the rotary spindles.

**PRODUCTION:** 1,250 covers per 50-minute hour . . . with machine operating at 25 strokes per minute.

If you are looking for increased output at lower cost, without sacrifice of quality . . . on assembly or production operations, or a combination of both . . . talk to Bodine first. Our experience can save you money and costly engineering.

Write Dept. TP-3.

THE Bodine CORPORATION
BRIDGEPORT 5, CONNECTICUT
AUTOMATIC DIAL TYPE DRILLING, MILLING, TAPPING, AND SCREW INSERTING MACHINES

7BD88

CIRCLE INFORM-A-GRAM KEY NO. 30

# Announcing...

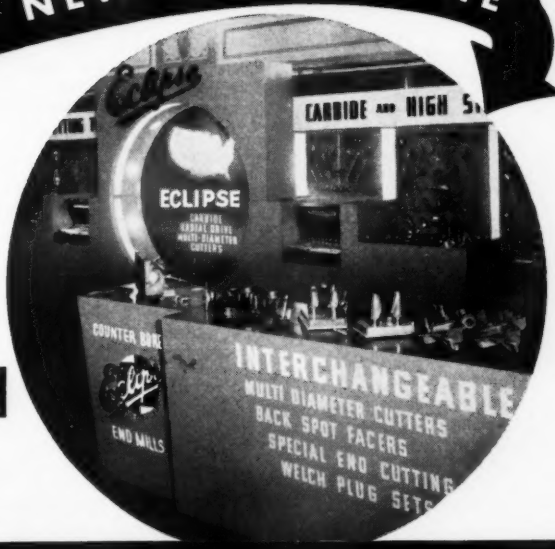
**. . . THE ADDITION OF PRECISION END MILLS TO THE ECLIPSE COUNTERBORE CUTTING TOOL LINE with the acquisition of WADELL TOOLS of North Branch, New Jersey!**

**These end mills, widely acclaimed in the industry, are unique in that their flutes and lands are ground in one continuous operation from solid hardened blanks. This insures identical dimensions throughout and eccentric relief rather than ground "back off". The cross-section affords maximum web strength and ideal rake contour.**

**Our proven precision automatic flute grinding method produces end mills giving superior performance which means longer life, finer finish and lower production costs.**

**For over 40 years Eclipse has specialized in hi-quality cutting tools; interchangeable carbide and high speed counterbores, countersinks, core drills and back-spotfacers. NOW precision end mills augment the ECLIPSE line making available another Eclipse tool in fields heretofore not serviced.**

**SEE THIS REMARKABLE NEW LINE AT THE**




## Booth 1121

## A.S.T.E. INDUSTRIAL EXPOSITION and CONVENTION

**INTERNATIONAL AMPHITHEATRE**

**CHICAGO • MARCH 19-23**

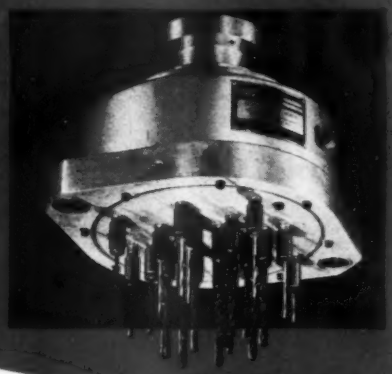
## ECLIPSE COUNTERBORE COMPANY

**1600 BONNER AVE., DETROIT 20, MICHIGAN**

**END MILL DIVISION—NORTH BRANCH, N. J.** (ADDRESS BOX 97, RARITAN, N. J.)

CIRCLE INFORM-A-GRAM KEY NO. 31

MAKE ZAGAR your HOLE CENTER FOR DRILLING, REAMING AND TAPPING . . . . . .

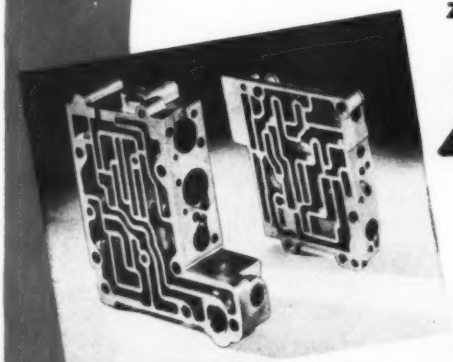


Any hole pattern — on any center up to 1½" dia.

## Zagar's Broad-Scope Engineering SOLVES ANY HOLE PROBLEM

Zagar meets every drilling problem with the most effective, low cost equipment: gearless drill heads, standard drilling machines, special drilling machines, and index, trunnion or pallet-type multi-station transfer machines. We can furnish the complete tooling if you desire. Perhaps Zagar drill heads can be installed profitably on your own drill press. Send us a drawing of the part you are planning to drill. Or, let us study your present situation with a view to reducing your drilling cost.

ZAGAR TOOL, INC., 23894 Lakeland Blvd., Cleveland 23, Ohio

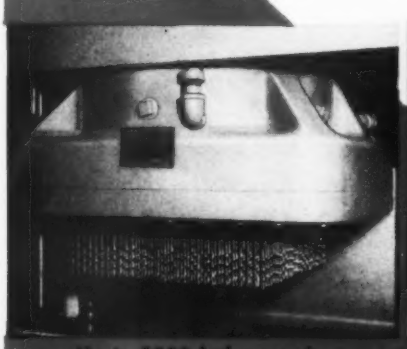


Any machinable material — from all angles.

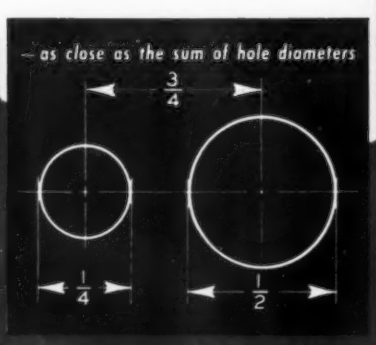
Zagar

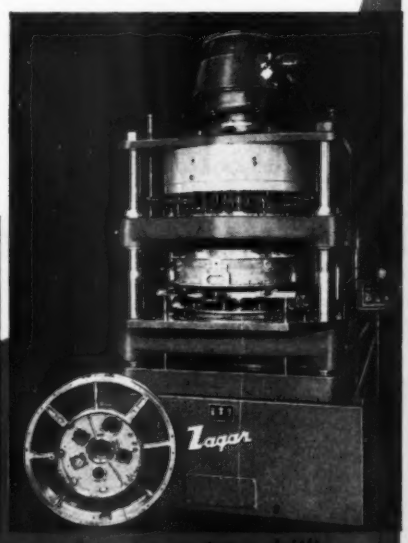
TOOLS FOR INDUSTRY and SPECIAL MACHINERY

We're at the A.S.T.E. Show — Booth 179



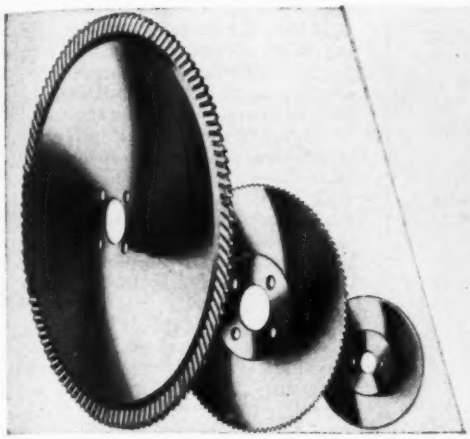
Up to 1000 holes can be drilled IN ONE PASS



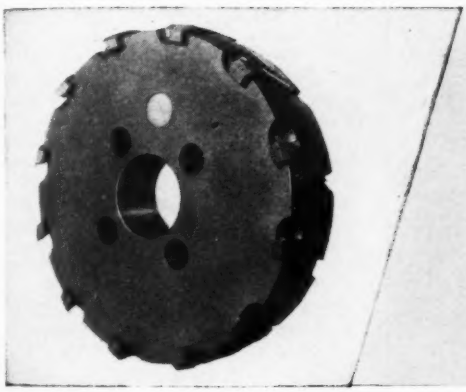

4-post ram-type drilling machine has pneumatic gears

# Seeing is Saving
## at MOTCH & MERRYWEATHER'S booth 1021
### A. S. T. E. EXPOSITION, CHICAGO



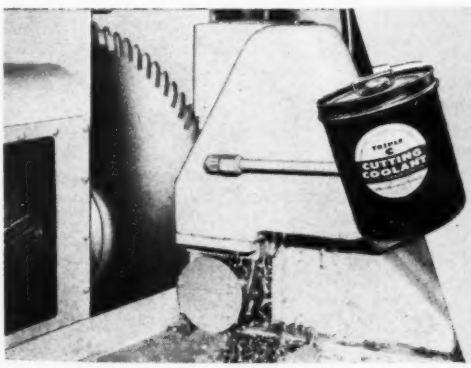
**M & M Triple-Chip Saw Blades Save Waste in Metal Sawing**

Complete line — segmental and solid — cut-off up to 108" dia., slitting down to 3" — for any machinable material, ferrous or non-ferrous, any size, any shape, any thickness. Less tooth strain, longer blade life, substantial savings in time and costs.



**KROSLOK Milling Cutters Save Time in Precision Milling**

Kroslok Face Milling Cutters and Shell End Mills cut any machinable material. Simplest design; only three members—body, blade, wedge. Serrations in body mate with cross serrations in blade. A profit-showing aid to accurate production milling.




**Three Triple C Products Save Trouble in Tool Care**

Triple C Grinding Coolant, Cutting Coolant and Machine Cleaner are Cool, Clear, Clean. Anti-rust, non-greasy, smokeless, odorless, foamless, non-flammable, non-clogging, safe for operators. A notable contribution to tool maintenance.

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**Cutting Tool Manufacturing Division**

*Stocking Dealers in All Principal Industrial Centers*

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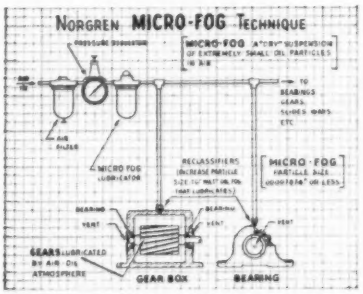
CIRCLE INFORM-A-GRAM KEY NO. 33

# Better Machine Lubrication Simplified

## *Norgren Announces the Only Complete Line of Aerosol Lubricators*

### . . . Now, MICRO-FOG Lubricators are available for 32, 200, 300, and 1000 Bearing Inch Requirements

The Norgren MICO-FOG principle has made practical the application of oil-fog lubrication to large machine tools, lubricating bearings, gears, chains, and other machine parts which always before have been lubricated by splash systems, force feed systems and other methods. Today, Norgren MICRO-FOG Lubricators are providing lubrication for large and small machines in many types of industry.

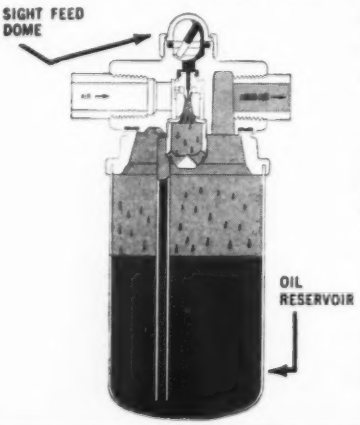



**What is Norgren MICRO-FOG?**

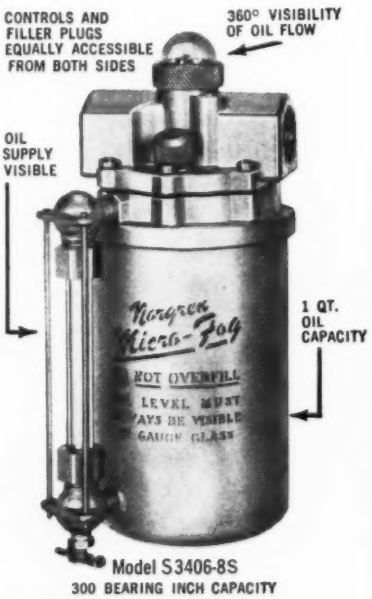
Norgren MICRO-FOG is an air-borne suspension of extremely small oil particles (.00007874" or less in diameter). Because the oil particles are so small, they can be conveyed long distances through complex piping systems without reclassifying and flooding the lines with oil — a condition heretofore not possible with conventional oil-fog systems.

**How is Norgren MICRO-FOG formed?**

Air passing through the venturi section of a Norgren MICRO-FOG Lubricator creates a pressure differential that draws oil from the reservoir. The oil is allowed to flow at a controlled rate into the venturi section.




The venturi creates an oil fog, discharging it into the upper regions of the oil reservoir. The heavier particles of oil return to the oil supply. Only the finer particles of 2 microns (.00007874") or less are carried into the air line.


CONTROLS AND FILLER PLUGS EQUALLY ACCESSIBLE FROM BOTH SIDES
360° VISIBILITY OF OIL FLOW
OIL SUPPLY VISIBLE
1 QT. OIL CAPACITY
Norgren Micro-Fog
DO NOT OVERFILL
LEVEL MUST ALWAYS BE VISIBLE
GAUGE GLASS

Model S3406-8S
300 BEARING INCH CAPACITY

**Now—A Lubricator for every requirement**

New models of MICRO-FOG Lubricators, having 200 and 300 bearing inch capacities, are now being manufactured by Norgren. These are in addition to the 32 and 1000 bearing inch capacity lubricators already in the Norgren line. The range of bearing inch capacities given by these models means that you can select a lubricator that will provide the most efficient lubrication for the job.

For complete information about Norgren MICRO-FOG Lubriation, call your nearby Norgren Representative listed in your telephone directory — or WRITE FOR NEW No. 700 CATALOG.

**C. A. Norgren Co.**

3449 So. Elati, Englewood, Colo.


. . . Report from Page 28

tained in this way is not very good. They seem not to have used electro-erosion, at least at this location, for working carbide or for drilling irregularly shaped holes, but they knew that this could be done.

They showed us an automatic balancing machine for balancing the rotors of electric motors. The rotor moves into position with the first position merely being a location step. It is then advanced to another location where it is spun and the unbalance is measured. Information on amount of unbalance and the location is stored in a memory device. The rotor is then moved into another position where drills automatically remove the required amount of metal. As set up, the machine requires an operator but full automation of this machine should be relatively easy once equipment is added to feed the rotors to the initial position.

There were a number of other interesting machines, such as tracer machines, under development at the Institute. In the laboratory connected with the plant there were a number of foreign-made machines (according to my memory, largely Swiss and German in origin) that were being subjected to tests.

A second visit was made to ENIMS on December 19, when I inspected some electrical controls on the floor and talked to the Director about the life time he obtains on the relays used in the control. He stated that the life of these relays was about a million cycles, but that the life would be much better if they could coat the contacts with silver or gold.

**Standards Institute**

The Institute of Standards, Measures, and Measuring Instruments is attached to the Council of Ministry. Its functions are parallel to that of our Bureau of Standards, except that it seems to be largely a service organization for industry in the Moscow area. Primary standards, for example, are kept in an Institute in Leningrad.

Here, housing was the poorest of any Institute we visited but the equipment, in the main, seemed adequate for its purpose. They have interferometic equipment, spectrographs, instruments for checking screw standards, etc., that seem to be quite good.

On December 12 we visited the Institute of Automechanics and Telemechanics. (Telemechanics refers to control and telemetering at a distance.) Work at the Institute is done on three main lines:

1. Division of general theoretical problems. Here work is done on the theory of automatic control, telemechanics, and design. Attention is paid to widest range development problems including non-linear me-

. . . Continued on Page 38

"... the BULLARD pendant control ... is sure handy for the operator"

Says boring mill operator at Fuller Company, Manheim, Pennsylvania, manufacturers of conveying equipment, coolers, compressors and vacuum pumps. Also, he says, "there are no levers to mess around with. On the Bullard H.B.M., Model 75, I can mill on a 45° angle in any quadrant instead of having to jockey in one direction, then in the other — like I had to do on the old machine."

the machine is outstanding for ease of operation

For full information on all the cost saving advantages offered by the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, including screw and rack feed, wide speed ranges, extra rigidity in Bed, Head, Head Post and Rear Post, optical measuring equipment (optional) and Automatic Positioning for head and table (optional),

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*Please send me a copy of the NEW H.B.M., MODEL 75 CATALOG ...*

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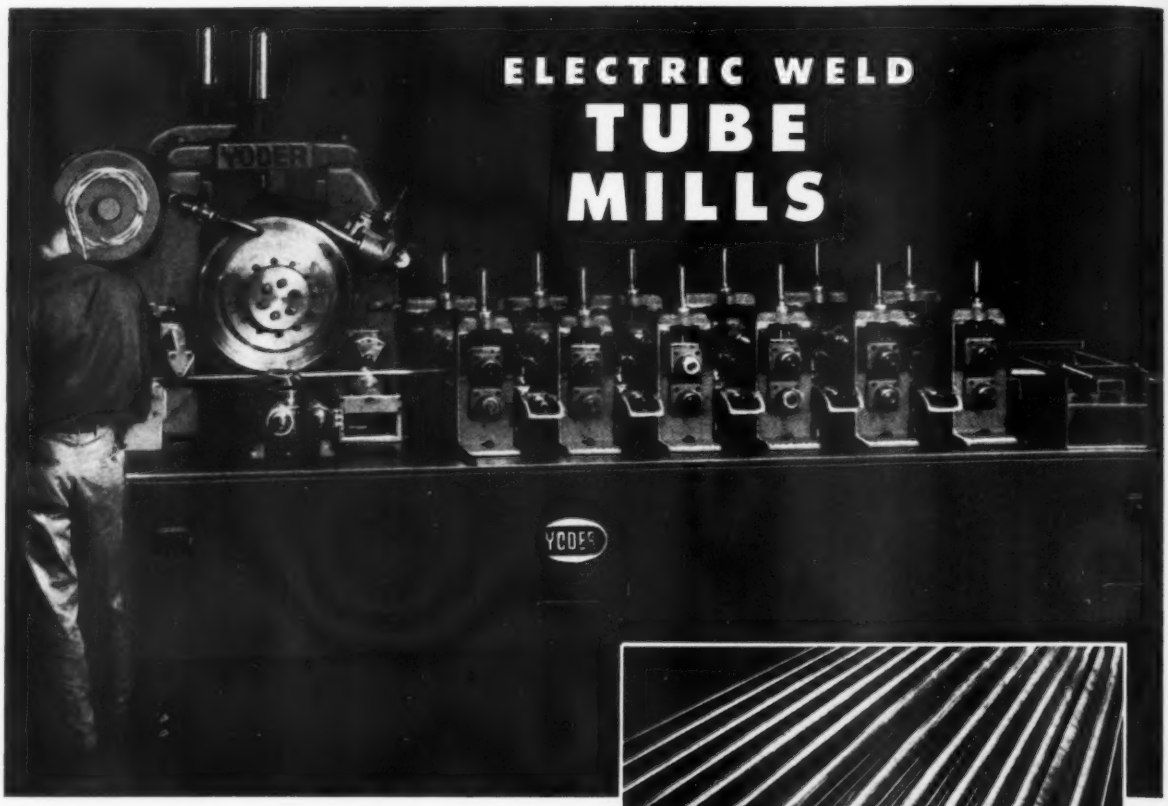
CIRCLE INFORM-A-GRAM KEY NO. 35



The photo shows the tube forming mill and welder of a complete Yoder mill recently installed for an Italian customer. Although it looks very much like a standard Yoder mill, it embodies special mechanical and electrical innovations designed for *tube production at speeds up to 350 fpm*—from 200 to 300% faster than heretofore considered practical by the resistance-weld process.

This is just one example of the many new things introduced by Yoder in pipe and tube making equipment, to meet widely varying production needs. Other recent Yoder developments are induction weld mills for making steel as well as nonferrous pipe and tubing, at speeds never before approached by this process, and adding greatly to its recognized economic advantages.

For more complete information about the latest technological advances in Yoder tube mill equipment, write, wire or phone

**THE YODER COMPANY**
**5501 Walworth Ave. • Cleveland 2, Ohio**

***Literature on Request:***

- ☐ **1.** Electric Weld Tube Mills for *Steel Tubes* up to 4" diameter.
- ☐ **2.** *Induction Weld* Tube Mills—sizes up to 8" diameter for aluminum, nickel, copper, brass, inconel, monel, stainless and other alloys.
- ☐ **3.** *Pipe Mills*—electric weld—for sizes up to 24" diameter.

ENGINEERING YODER MANUFACTURING

**PIPE AND TUBE MILLS—Electric Weld**
**ROTARY SLITTING LINES**
**COLD ROLL FORMING MACHINES**

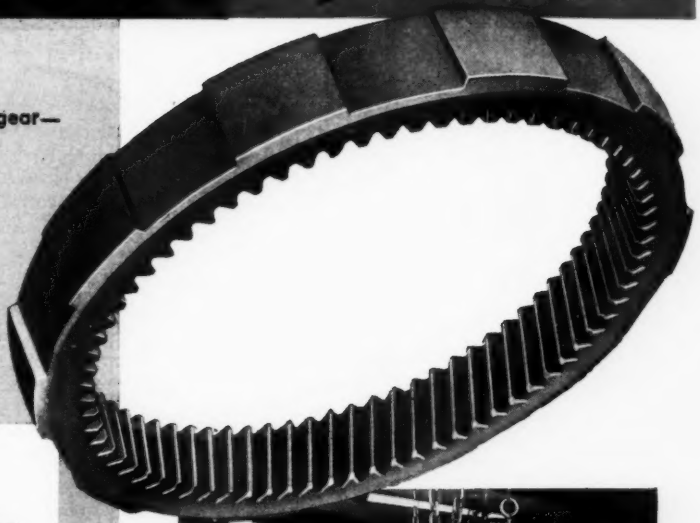
CIRCLE INFORM-A-GRAM KEY NO. 36

# Broach Your Helical Transmission Gears and Cut Your Costs

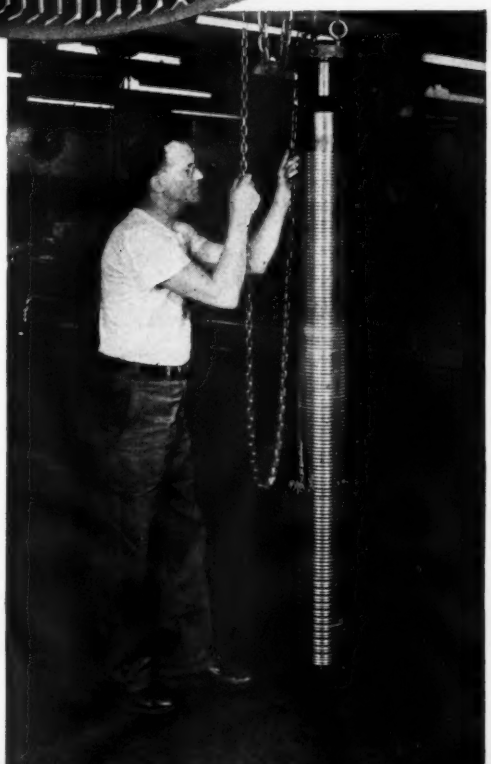
This is a 73 tooth automatic transmission gear—5.5853 P.D., 14 pitch, 20° pressure angle.

It is broached in just one pass. A single shaving operation completes it.

All critical dimensions including lead and concentricity are held to extremely close tolerances.



| | |
|---|---|
| Broaching time | 25 Seconds, floor to floor |
| Shaving time | 40 Seconds, floor to floor |
| Total machining time | 65 Seconds |



The 7 foot Naloy Broach used also chamfers the gear tooth edges as it cuts the teeth.

The constant and intimate contact Red Ring engineers have with advanced gear practice gives them a very real advantage in the design and production of gear tooth broaches.

*Write* for specific suggestions on your broaching operations.

**NATIONAL BROACH AND MACHINE CO.**

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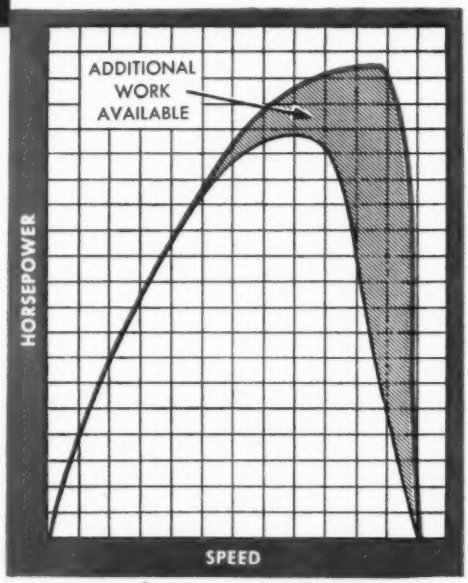
WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

CIRCLE INFORM-A-GRAM KEY NO. 37

**BUCKEYE X-4 ABRASIVE TOOLS**

**extra power...**
**same light weight...**
**greater efficiency...**
**MORE WORK PER TOOL!**

here's proof BUCKEYE X-4 tools deliver extra work




*(for even better proof, put an X-4 on your job and get that extra work!)*

Look up the toughest metal removal job in your plant, maybe a job that's been fouling up your production schedule for some time. Put a new Buckeye X-4 tool on that job—and stand back!

What happened to the tough job? Why, it's all finished—just like that! And the tool operator's surprised grin lets you know he's never used a tool like this before . . . a tool that whips a tough job quick and easy. With Buckeye X-4 abrasive tools working for you, you'll grin, too—every time you look at that production schedule!

Complete information on these all-new, bright-red Buckeye X-4 abrasive tools will be found in our new Catalog A-10. We'll be glad to send you a copy . . . just tell us where and to whom.

You can get X-4 performance from your present Buckeye D, E and F Series grinders, buffers and sanders. Just tell us code names and serial numbers of tools you are now operating and we'll tell you how.

**Buckeye Tools** CORPORATION
DIVISION 19 • DAYTON 1, OHIO

producers of the world's first successful rotary air tools

CIRCLE INFORM-A-GRAM KEY NO. 38

. . . Report from Page 34

chanical devices. High speed devices, instrument precision and impulse type systems are also studied.

2. Division of digital systems theory. A theory of relays is handled here which includes Boolean Algebra and its application to measurement and control systems. Work is done on pneumatic, hydraulic and electric systems. Studies have been made on instruments for measurement in industrial control systems.

3. Division of the automation of industrial processes. It is believed that the activities of this Institute are largely of a consulting nature. They stated that the work is done mainly in the factories but questions are answered in the laboratories.

At this Institute by far the most impressive thing was the analog computer for solving up to 6-order differential equations, linear and non-linear. The unit is a good analog computer for theoretical study of servo problems. It seemed to be quite convenient to use and was very compact, perhaps too compact as the unit seemed to run rather hot. Accuracy is about 5%. It is possible that some of the theoretical work going on at the Standards Institute may be rather good, but it is nearly impossible to evaluate a theoretical program when working through a non-technical interpreter. It is the writer's impression that they are doing better work in hydraulic and pneumatic servo systems than they are doing in electrical control systems.

**Soviet Auto Production**

We visited The Gorki Automobile Factory on December 13 and 14. It was set up in 1932 with considerable help from U. S. The company is now planning production of a new model, the Volga, which will supersede the Pobyetta. One unit has been produced and has passed its state tests. It is now undergoing factory tests. In all, the plant now makes both trucks and cars, including the Pobyetta, Zim, and Gaz 69, which is very similar to our Jeep.

The site for this factory was picked out with the help of Ford engineers. It has its own town, schools, evening school and technical school. Many of its workers get a technical or engineering education. The plant has a club, cinema, and theater.

Electrical equipment for the cars is made elsewhere, as are tires, art leather, textiles and batteries. Their practice seems to be similar to U. S. as far as division of parts made by automotive companies and those purchased outside.

Electrical design work is the responsibility of the suppliers, meaning that the factory writes specifications for the equipment, the Insti-

. . . Continued on Page 44

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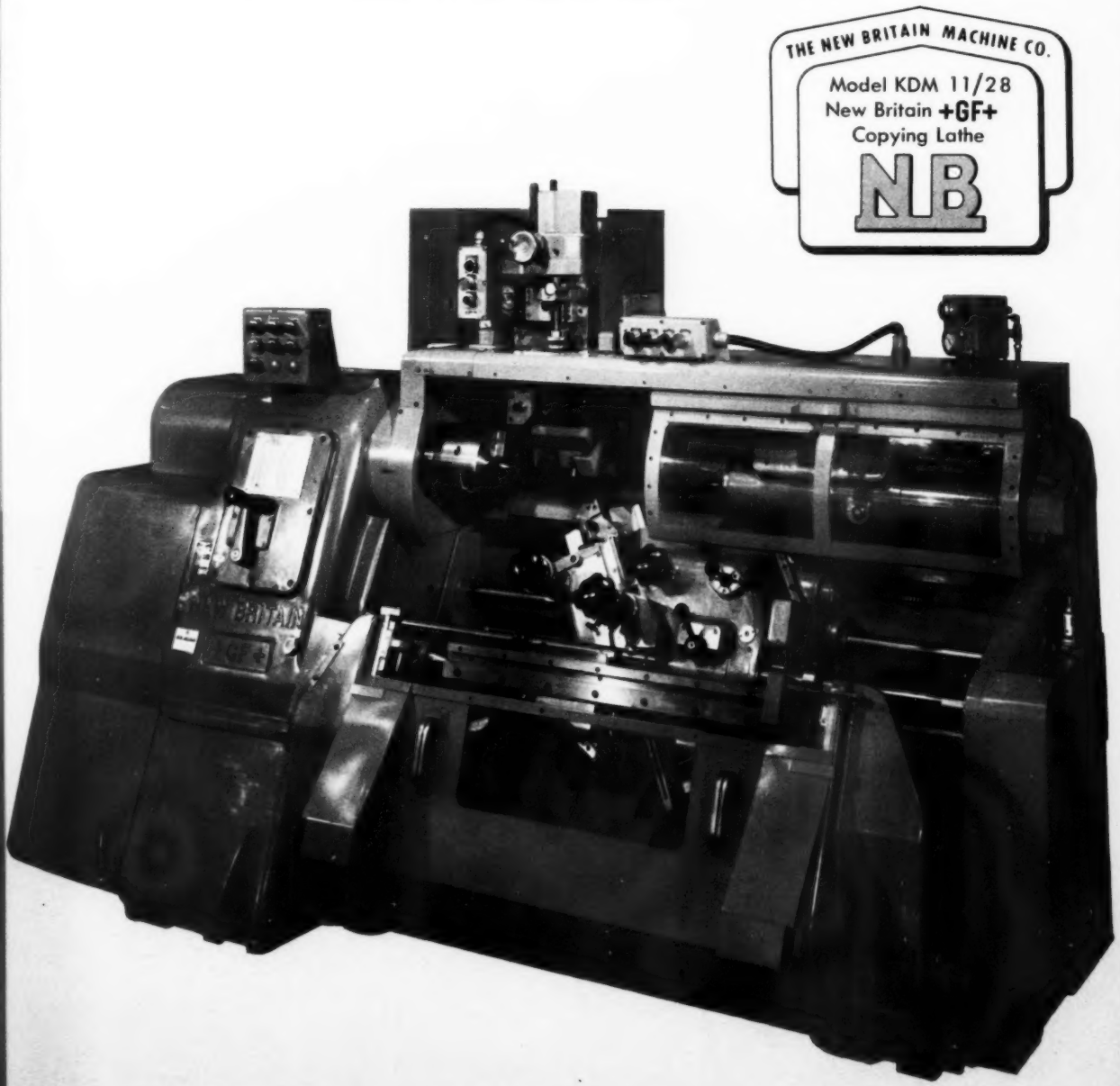
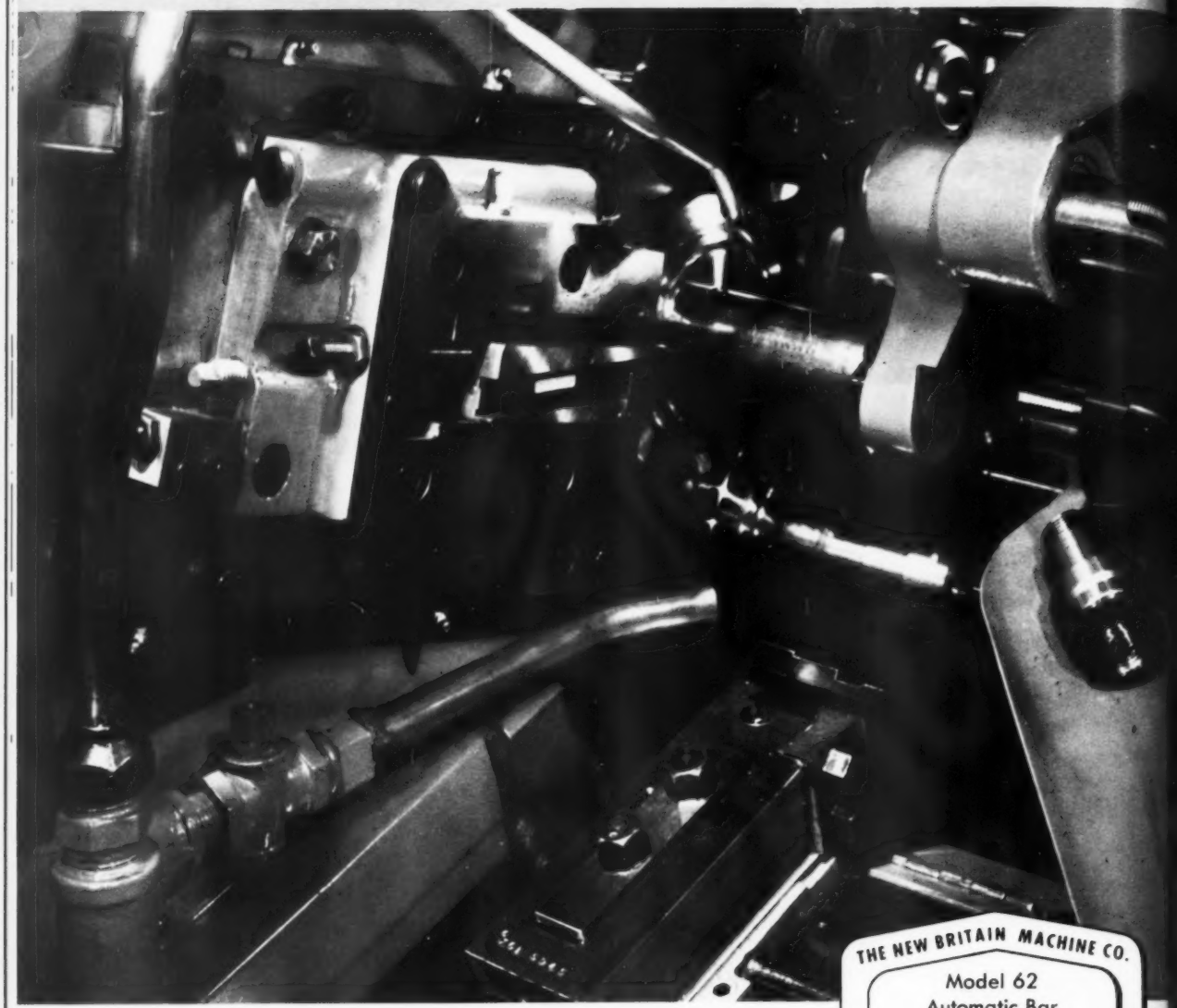
You'll find New Britain **+GF+** Copy Lathes are turning out pieces at profit. With a 15-minute setup on a standard model to make just a few pieces, or with an automatically loaded production model to run a million a year, the New Britain **+GF+** approach can make money for you. For a complete color motion picture demonstration in your office, consult your New Britain representative or write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.





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Model 62
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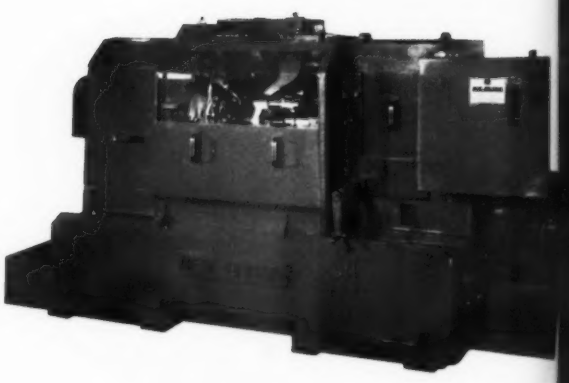
## a rugged cross slide in every position

New Britain Models 60 and 61 Automatic Bar Machines are everywhere you turn. The new Model 62 represents new progress in rugged construction and versatility of setup. Your New Britain Representative can show you how to modernize at a profit. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



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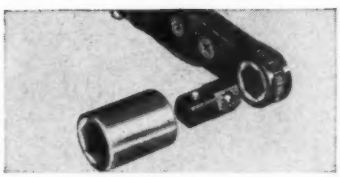
Driving hex-head sheet metal screws in confined area of stove with Keller Tool Ratchet Wrench.

# Running nuts in close quarters? Then use Keller Tool Air-Powered Ratchet Wrenches

You name it . . . on heavy machinery or lighter assemblies like this stove, close-quarter nut running is a cinch for a Keller Tool Ratchet Wrench. Wherever the nut location, there is a ratchet wrench or attachment to keep bottlenecks out of assembly operations.

Talk over your problem with a Keller Tool representative. Chances are he can supply a standard ratchet wrench that will turn the trick slick as silk.

**Operate anywhere** . . . in close quarters . . . hard-to-get-at places. Save skinned knuckles . . . effort.



Adaptor and socket—for hard-to-reach places or cramped positions.

Built-in, extended socket—for reaching behind channels, around corners.

Angle type—for flat on floor or under an overhang nut setting.

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CIRCLE INFORM-A-GRAM KEY NO. 42

# FIELD REPORT: NO. 90

## WHICH DIE STEEL WOULD YOU USE HERE to get this punch out of hardening in one piece?

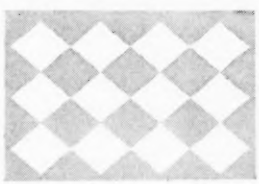
This punch blanks automotive stampings from SAE 1010 strip, .062" thick. It is so unbalanced in design that safety in hardening is vital in the die steel used. Since the punch is shear fitted to the die section before heat treating, accuracy in hardening is equally important. The punch is hardened to Rockwell C-61/62. All the steels tried either broke or changed size excessively.

If the decision were squarely in your lap, which die steel would you be willing to recommend?

Here's how the manufacturer solved the problem, as recorded in a Field Report from our customer: The Carpenter Matched Set Method showed that Carpenter VEGA (Air-Tough) Die Steel had the hardening safety and accuracy plus toughness demanded by the job. The punches are now coming through heat treatment "right on the nose," and production between grinds has jumped from about 10,000 to 50,000 parts. Further, the heat treater says VEGA is the easiest air-hardening steel he has ever worked with.

When the decision is up to you, rely on Carpenter for *dependable* results. For fast attention to your orders, call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, today. *The Carpenter Steel Co., 106 W. Bern St., Reading, Pa.*

**Your toolroom can use Carpenter Matched Tool and Die Steels to:**



Reduce hardening hazards
Minimize machine downtime
Boost output per grind
Improve product quality

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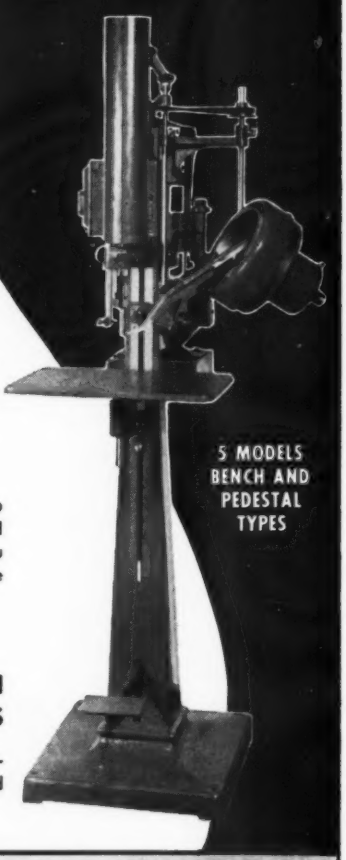
MODERN POWER METHODS!

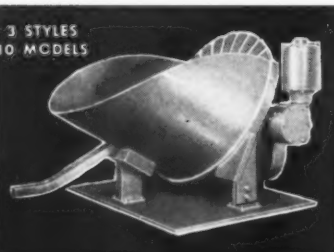
*No need for PRODUCTION DRAG on these assembling and feeding jobs!*

When you can combine greatly stepped-up output with reduced costs, quality control and uniform results, it adds up to benefits you can't afford to ignore . . Advantages that are emphasized by the use of

DPS POWER SCREWDRIVERS and SELECTIVE PARTS FEEDERS

And remember, D.P.S. specially trained engineers are ready to tackle your problem and come up with the right answer.

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CIRCLE INFORM-A-GRAM KEY NO. 44


. . . Soviet Report from Page 38

tute of Electrical Equipment designs it, and the supplying factory manufactures it.

When we asked who decided that the new Volga should be designed, it was stated that the factory began to work on the design problem when they saw that the Pobyetta was obsolete. The Ministry (probably Ministry of Automobile Manufacturing) decided that a new model was needed between the Pobyetta and the Zim and set up the requirement that the new model should not be more expensive than the Pobyetta. It was also stated that the unit should not exceed the Pobyetta in dimensions, should have the same reliability and life, and should show improved performance and comfort.

The Gorki plant has about a million square meters of area and 45,000 workers. It produces a thousand vehicles per day of all kinds, of which 120 are passenger cars, 100 are agricultural vehicles, and about 780 are trucks. Bicycles are also produced here but in the near future it is expected that they will be discontinued. The capacity of the Pobyetta line is about 150 per day. Obviously it is not working at this capacity since total passenger car production is 120 per day including the Zim.

During our return trip made on December 14, a discussion was held with Mr. Alexev and Mr. Mazorkin. Mazorkin won a Stalin prize for designing the Volga. Both of these men have carried on experimentation with high frequency ignition systems. They state that in theory this system can provide better efficiency or make it possible to use poorer fuels. They did not carry out detailed checks of the theory, however, as early road tests showed that the electronic design they used had poor resistance to shock and was completely impractical for use in an automobile.

There are norms for all workers, including day workers. Norms are the responsibility of a department known as Department of Organization of Labor, and bonuses are paid for exceeding the norms.

Labor unions organize the workers to fulfill tasks, are responsible for education, for paying sick benefits, distributing maternity benefits, various aid programs, rest houses and sanitoria.

---

**Editor's Note:** The second part of Dr. Brandt's Report — his comments on Soviet bearing, tractor, and switchboard production, along with his over-all remarks — will appear in next month's issue.

HIGH STANDARDS SET BY THIOKOL FOR...

# IMPACT RESISTANT PLASTIC TOOLING

Resilient plastic tooling compounds based on combinations of THIOKOL Liquid Polymer with liquid epoxy resins are used for the toughest tooling jobs. Dies capped with these resilient plastic compounds absorb the terrific stresses of drop hammer forming without cracking or chipping . . . smoothing action of the compounds produces high-quality parts such as duct halves, beads, channels, and shallow pan sections in aluminum and steel with minimum wrinkling. Plastic tooling compounds containing THIOKOL Liquid Polymer packaged as liquids are easily worked and can be cold molded to exact finish contour with negligible shrinkage. They do not require heat for mixing or setting to tough, resilient plastics. Expensive hand grinding and scraping are eliminated. For full information write: THIOKOL CHEMICAL CORPORATION, 784 N. Clinton Ave., Trenton 7, New Jersey. IN CANADA: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario.

Thiokol Chemical Corporation manufactures Thiokol Liquid Polymer only as a raw material. We are happy to indicate sources of suitable compounds for end use.

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SEND FOR THIS
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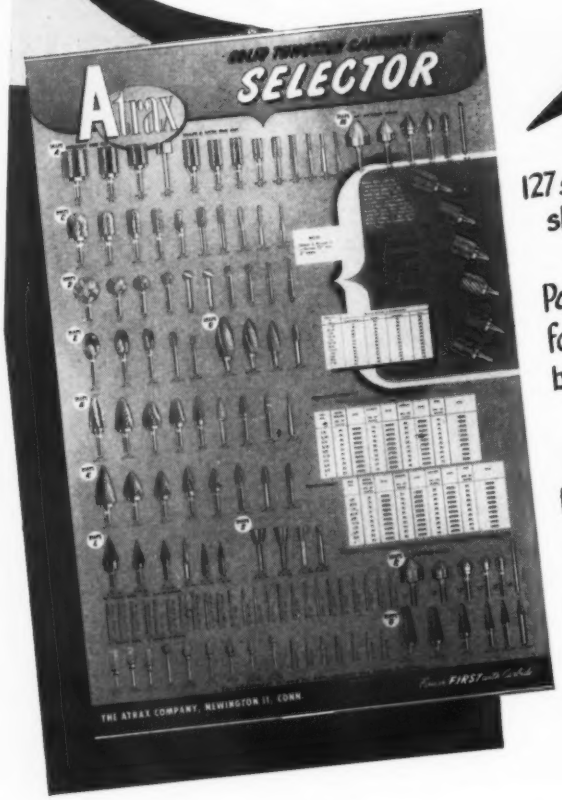
BUR SELECTOR CHART
Today!

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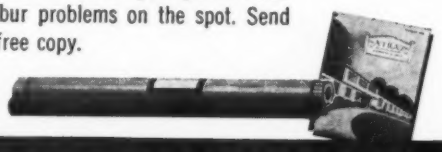

Atrax
THE ATRAX COMPANY
Newington 11, Conn.

## *Will You Be There?*

**Mar. 14-16.** Spring Technical Meetings, Pressed Metal Institute. Carter Hotel, Cleveland, Ohio.

•

**Mar. 19-21.** Industrial Diamond Symposium. Armour Research Foundation of Illinois Institute of Technology and American Society of Tool Engineers. Illinois Tech Commons Building, Chicago.

•

**Mar. 19-23.** 24th Annual Convention, American Society of Tool Engineers, International Amphitheatre, Chicago, Ill.

•

**Mar. 19-23.** American Society of Tool Engineers Industrial Exposition, International Amphitheatre, Chicago, Ill.

•

**Mar. 23 and 24.** The American Society of Mechanical Engineers. Third Annual Engineering Management Conference. Hotel Statler, Cleveland, Ohio.

•

**Apr. 4-6.** American Society of Lubrication Engineers. Annual Meeting and Exhibit. Hotel William Penn, Pittsburgh, Pa.

•

**Apr. 4-7.** National Screw Machine Products Association. Annual Business Meeting. Hotel Schroeder, Milwaukee, Wis.

•

**Apr. 9-12.** American Management Association. Silver Anniversary Packaging Exposition. Convention Hall, Atlantic City, N. J.

•

**Apr. 10-12.** Metal Powder Show. Hotel Cleveland, Cleveland, Ohio.

•

**Apr. 16-18.** Great Lakes District Meeting of American Institute of Electrical Engineers. Fort Wayne, Ind.

•

**Apr. 18 and 19.** Armour Research Foundation of Illinois Institute of Technology. First Annual National Industrial Research Conference. Hotel Sherman, Chicago.

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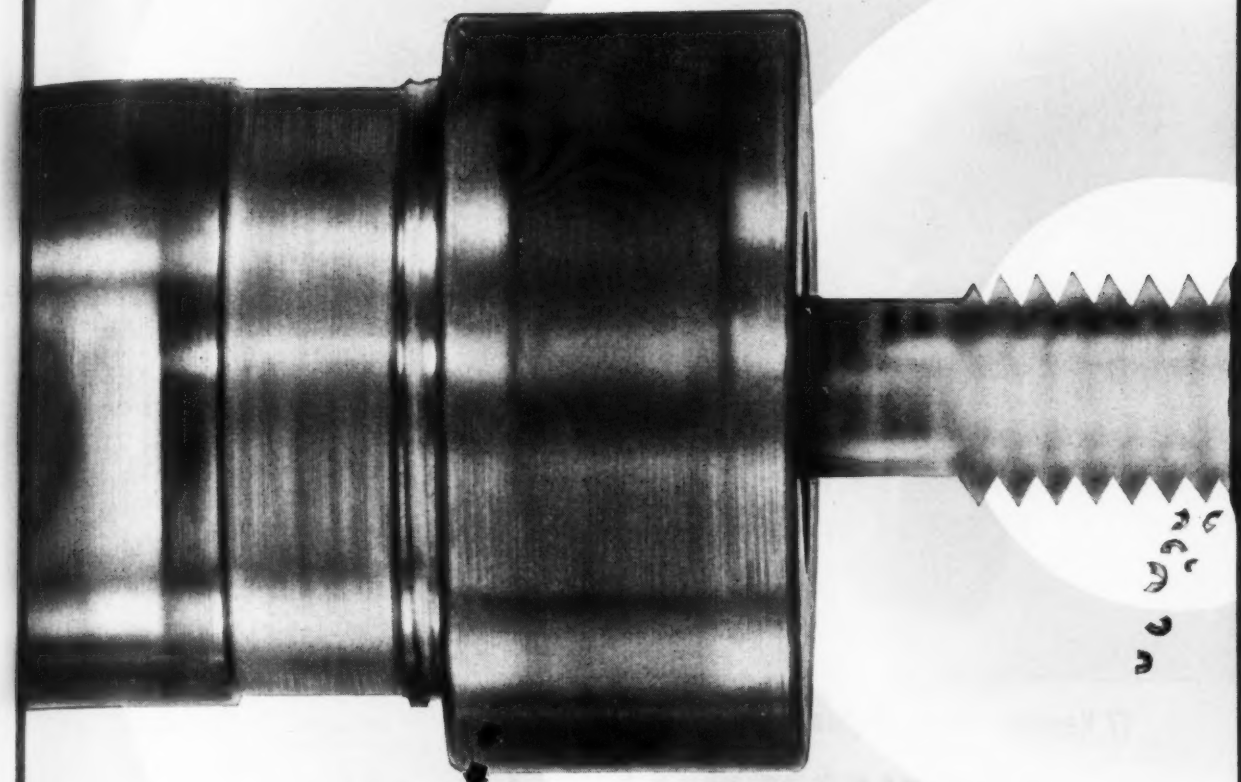
CIRCLE INFORM-A-GRAM KEY NO. 46



# Tops for Taps... it's a *Jacobs* CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks... first in service.

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The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.

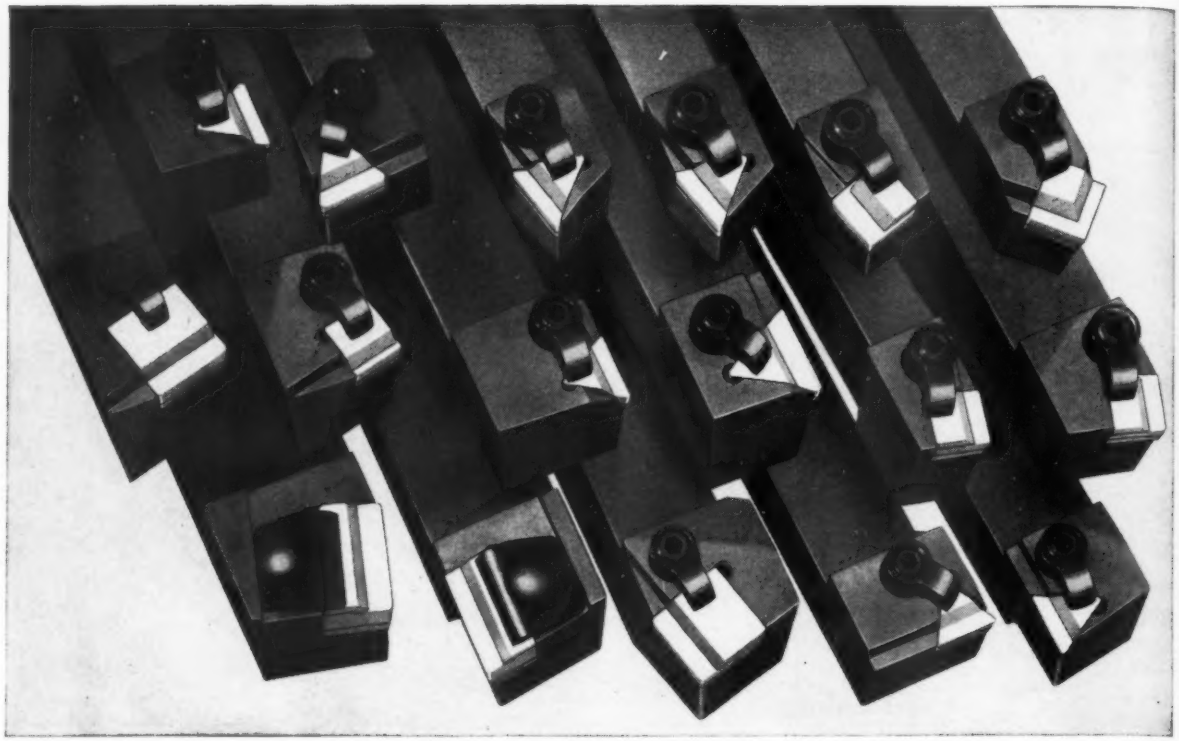
The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.

The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.

The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.

The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.

The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.



**17 Kendex† holder styles and 101 different tools**

# KENNAMETAL* today offers the tooling for tomorrow

Kendex Button and Heavy Duty tools can truly be considered as the "Tooling for Tomorrow."

Kendex holders are simple and rugged in construction; fitted with trouble-free, interchangeable "hardware"; accommodate square, round and triangular turnover, throw-away button inserts that eliminate costly grinding . . . all features needed to keep tomorrow's high speed, highly synchronized production lines on the go—hour after hour.

"Tooling for Tomorrow" must face up to varied cutting jobs, on many types of machines . . . machines that will require quick, accurate tool changing for close tolerance work at high speeds and low costs per piece. Kendex tooling was designed for such conditions. In addition, it increases efficiency; lowers tool investments; sharply reduces maintenance costs. There are over 100 Kendex tools and 35 different Kendex inserts—some stocked in as many as six Kennametal grades.

Why not have a Kennametal tool engineer help you step up efficiency on today's jobs with Kendex "tooling for tomorrow." He works exclusively with Kennametal tooling . . . applying and servicing it. This specialized experience is yours for the asking. KENNAMETAL INC., Latrobe, Pennsylvania.

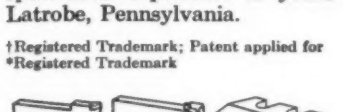
## Eleven Kennametal Grades . . . To Give You Top Performance

No matter how versatile or rugged the toolholder—final performance depends on the cutting edge. Here's where hard, uniform, dependable Kennametal blanks and inserts will pay off on your operations—regardless of the job or machine. With eleven grades to select from, you can get top performance on every cutting job.

Try Grade K21, the ideal general purpose steel cutting grade that is outperforming all other general purpose carbides, and its companion . . . Grade K5H . . . a hard crater-resistant grade for finish machining at high speeds. Kennametal's simplified grade selection system makes it easy to get the right grade on every job.

†Registered Trademark; Patent applied for
*Registered Trademark

A-9435



MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS



INDUSTRY AND
KENNAMETAL
...Partners in Progress

ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

CIRCLE INFORM-A-GRAM KEY NO. 48

Stamping output Up 400%
Output Up 192% On Lathe Turning
4 Holes Drilled 7 Times as Fast
Reaming Production Doubled
Bead Rolling Time Cut 50%
Milling Production Doubled

**The key to every one of these production gains is a unique air cylinder whose basic cost was less than the operator's weekly pay check.**

Production Increase In Surface Milling 300%

Hollow Milling and Drilling Production up 400%

Counterboring Production Jumped 133%

Deep Hole Drilling Output Increased 350%

40% Gain In Milling Production

End Milling Time Cut 54%

400% Production Gain In Drilling and Tapping

Output of Shell Molds Increased 813%

Every machining operation pictured here is being done on inexpensive, shop built, special purpose machines. Designed either by the companies' own engineers or by a Bellows Field Engineer, the machines were built from parts normally available in every tool room. But the heart of each machine — the thing that makes it tick — is one or more Bellows Air Motors — an air cylinder so different that it has sparked the creative imagination of tool engineers and production men in more than ten thousand plants.

This air cylinder, alone among all air cylinders made, combines the speed and flexibility of air, the sureness of electrical control, and, with the Bellows Hydro-Check control, the smoothness of hydraulics, all in one compact, packaged power unit.

Bellows Air Motors can be applied to hundreds of different standard machines to speed up feeding or ejection of parts; to feed tools faster, more accurately, safer; to permit relatively unskilled operators to turn out top quality work. They can be incorporated in special machines to perform any repetitive push, pull, lift or turn motion. The range of their usefulness is limited only by the ingenuity of the user.

**These new booklets tell the story**

**WRITE FOR THEM TODAY!**

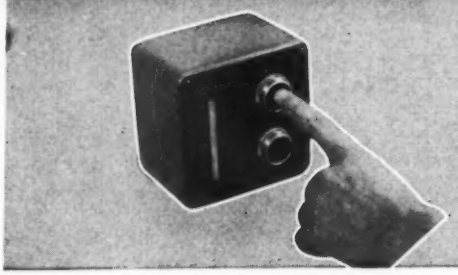
*Here in these fast reading 4-color bulletins is the dramatic story of Bellows Air Motors and other Bellows "Controlled-Air-Power" Devices. Packed full of design information, case history data, photographs and diagrams — information every man concerned with costs and production should have. They are free on request. Ask for Bulletins ML-3 and BM-25. Write — Dept. TP356, The Bellows Co., Akron 9, Ohio. In Canada, Bellows Pneumatic Devices of Canada, Ltd., Toronto.*

813A-1

**The Bellows Co.**
AKRON 9, OHIO

HARDINGE
ELMIRA, N.Y.

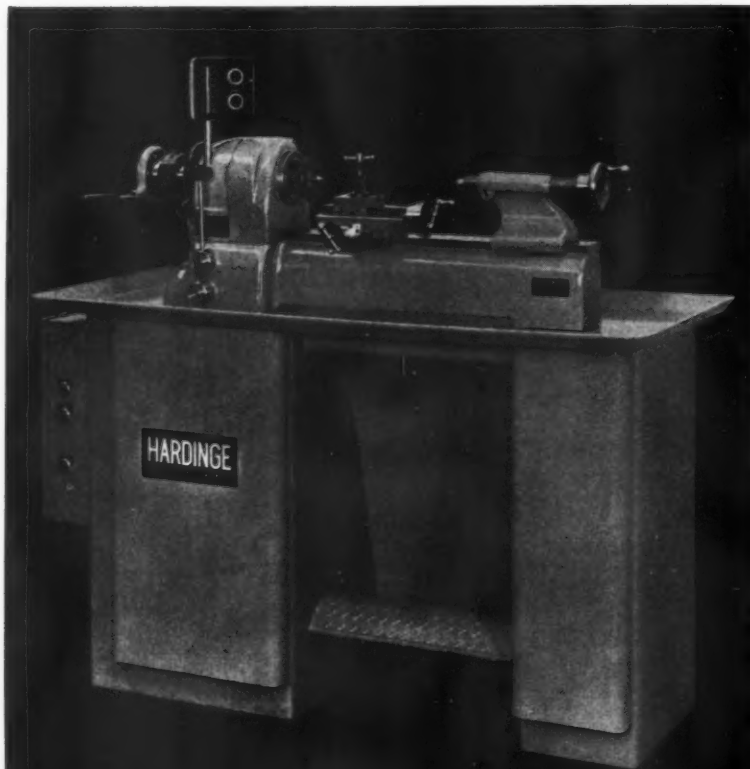
**NEW Lathe with Variable Speed**
**for**
**Tool Room—Development—Production Work**



**Simply Push a Button for Exact Spindle Speeds**

*It's the NEW Simplified Design*

**EASY AND CONVENIENT TO OPERATE**




**FEATURING:**

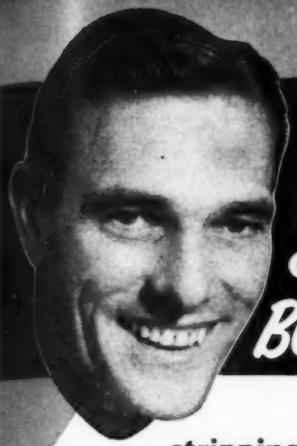
- Infinitely Variable Speeds 230 to 3500 r.p.m.
- Fast Lever Operated Collet with 1 1/16" Capacity
- Hardened and Ground Steel Dovetail Bed Ways
- Patented Positive Lock Slide Rest
- Full Bearing Tailstock
- And Other Cost Cutting Features

*For Complete Information on this Precision Lathe Write for Bulletin DV59*

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

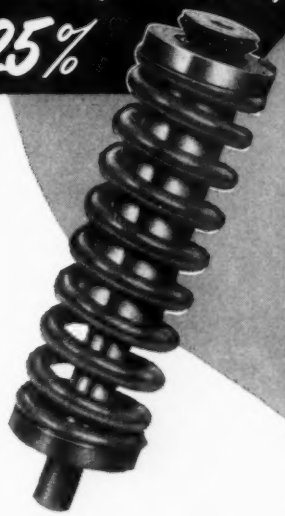
See HARDINGE MACHINES IN ACTION – SPACE 452 – CHICAGO – A.S.T.E. SHOW

CIRCLE INFORM-A-GRAM KEY NO. 50



# WALES "Strippits"

## can save up to 60% time, BOOST PROFITS 25%



### . . . stripping metal from conventional dies the 'WALES-WAY'

WALES STRIPPITS are springs, held compressed by retainers. Uneven stripping pressure is eliminated completely, being constantly standard at all points and at all times.

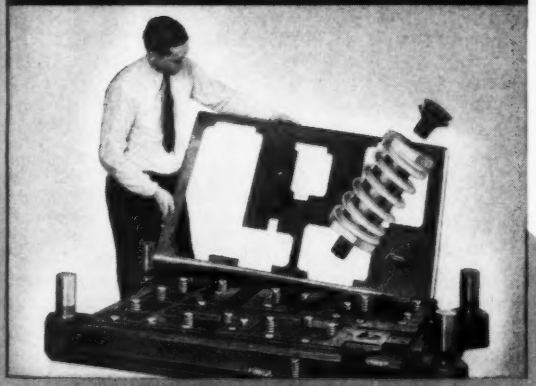
Get rid of the costly delays caused by removing dies from the press to repair broken punches, springs or defective die steel. With WALES STRIPPITS, dies never need be removed nor dismantled in order to make repairs.

Stripper plates can be removed quickly and easily, in the press, with WALES STRIPPITS. The plates can be one half conventional thickness or non-existent because there is no pressure exerted until the Strippits go into action.

Save up to 60% man hours and material cost in die making the 'WALES-WAY'. All machining of punch holder and die shoe is done from the 'face' side.

Installation of WALES STRIPPITS is so easy. Saves hours in setting up any die pattern. No springs to grind, no stripper bolts to make, no drilling and counter-boring for stripper bolts, no spring pocket boring. WALES STRIPPITS pay for themselves over and over in time saved on every job. Use the same WALES STRIPPITS many times over. Shops throughout the country use and recommend WALES STRIPPITS.

NO STRIPPER PLATES USED HERE



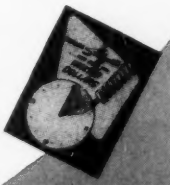
This picture shows work blanked by die, equipped with WALES STRIPPITS. Even STRIPPIT pressure releases work piece instantly.

### *Why not use our* ENGINEERING SERVICE ?

Our Engineers will be happy to make an analysis of your production and give you suggestions as to how WALES STRIPPITS can supplement your present methods and INCREASE YOUR PROFITS. No obligation, of course.

### *Send for* BULLETIN NO. 11B

Filled with pictures and examples of WALES STRIPPITS in use. Information that should be valuable in YOUR shop. It will be mailed to you without charge and by return mail.



**WALES *Strippit* CORPORATION**

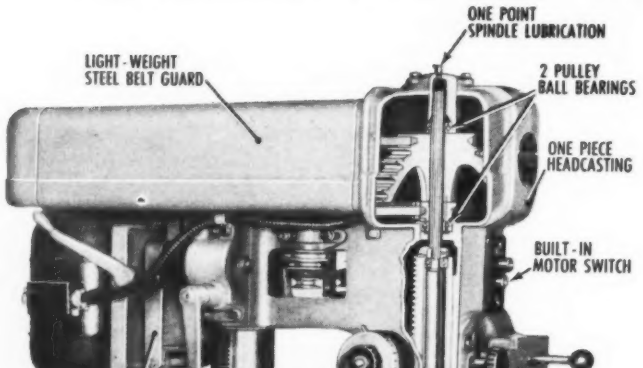
**"...the Wales-Way is the PLUS-PROFIT way"**

**345 PAYNE AVE. — North Tonawanda, N.Y.**

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

***See Our Exhibit—Booth 379 Chicago, March 19-23***

W-T
ALKER-TURNER



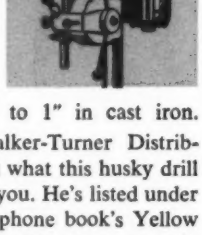

COMPARE — You'll see that you get a lot more for your money when you buy W-T "Light-Heavyweights"!

**Here's the inside story of fast, accurate production!**

The features you see here add up to unusually fine engineering — the kind you normally find only on heavy, expensive drill presses. But Walker-Turner's 20" press gives you the combination you want — high production rate, at low initial cost.

You can have this W-T 20" Drill Press with hand feed, power feed or the new W-T Air Feed — in bench or floor models; you can set it up in any number of multiple spindles.

*1100 Series — Walker-Turner "LIGHT-HEAVYWEIGHT" 20" Drill Press:* 6" spindle travel. 10 spline manganese steel spindle. Unusually wide range of speeds — 260 to 2600 rpm, with 1140 rpm motor. Capacity to 1" in cast iron.



Ask your Walker-Turner Distributor to show you what this husky drill press can do for you. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and we'll send full descriptions.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT — RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS — RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS — JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

walker-Turner

**WALKER-TURNER**
Division
Kearney And Trecker Corporation • Plainfield, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 52

# BOOK REVIEWS

1955 COLLECTED TECHNICAL PAPERS. Published by the American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38, Mich., 1955. 347 pages, Price $5.00.

The leatherette bound volume of "1955 Collected Technical Papers" presents in one volume all of the papers and panel discussions presented at the 23rd annual convention of the ASTE in Los Angeles. It covers 16 separate lectures, four panels, and an ASTE Research Fund report on workpiece temperature distribution, comprising a total of 36 papers of current interest.

A variety of essential subjects are discussed including, among others, the use of magnesium for low-cost tooling, coding and classification systems, cold steel extrusion tooling, ceramic parts and tooling for mechanical applications, heat treating steel and aluminum, equipment leasing, and the setting of automation goals.

Subjects discussed by the four panels are: Plastic Tooling for Production, Preparing Engineers for Manufacturing Responsibilities, Coordination of Manufacturing Management, and Quality Control Through Realistic Tolerances.

THE MACHINIST DICTIONARY by Fred H. Colvin. Published by Simmons-Boardman Publishing Co., 30 Church St., New York, N. Y., 1956. 496 pages, Price $7.50.

Information concerning machine terms, definitions, parts, materials, and standards have been compiled into a very usable dictionary by Fred Colvin, author of over 50 technical books and long associated with various branches of machine manufacturing.

Tables, charts, lists, and illustrations clarify and extend the information in the text. The many tables of standards are included in order to save time and to present all the pertinent facts in one volume, for the convenience of the reader.

"A knowledge of the terms used at present and in the past, plus a knowledge of standards which have been adopted, is necessary for economical design and manufacture," the author states in his preface. Cross-references are included to enable the dictionary's users to find both old and new terminology for identical items.

. . . *Continued on Page 54*

## Talking About Die Sets

*with*
**Phil Marsilius**
*Vice-President*
*The Producto Machine Co.*

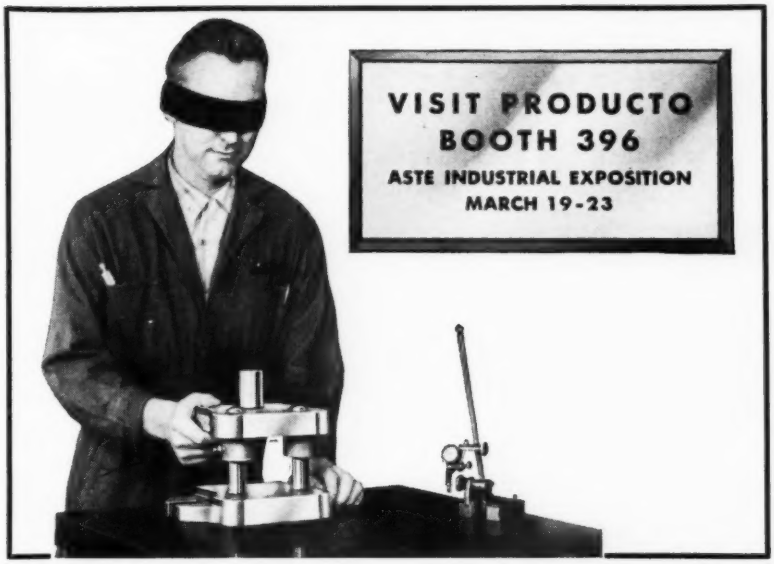
**"Tooling for Tomorrow"**—This month's ASTE Exposition in Chicago offers you an opportunity to find out whether your tooling practices and facilities are keeping pace with the many technological advances being made throughout industry. You will be able to see the latest tooling developments on display in more than 450 exhibits.

**Major die set advances** have been made since the last Tool Show and many of the leading die set manufacturers will be exhibiting them at the International Amphitheatre. "Tooling for Tomorrow" includes radical changes in the design, appearance, performance and accuracy of die sets and their components; new lubrication methods; and numerous new die accessories. The Tool Show is a rare occasion for you to inspect, compare and select the developments best suited to your particular die set requirements.

**Related diemaking equipment,** of course, will be displayed along with thousands of other products intended to improve your manufacturing operations. The editorial pages of this magazine give you an excellent preview of some of the outstanding tools, machines, materials and processes to be demonstrated for the first time in Chicago on March 19-23.

**You will also want** to attend a number of the ASTE technical sessions. Such vital topics as "Plastic Tooling Challenges the Tool Engineer" and "Solving Carbide Die Problems" are on the well-balanced program. And you can choose from 12 conducted tours to plants in the Chicago area.

**If you have not yet** made plans to attend the ASTE Exposition, we urge you to do so. We cordially invite you to stop at Booth 396 for a personal chat about die sets. Adv


***Try Our "Blindfold Test" at the Show and See How:***

# PRODUCTO'S NEW DIE SET CAN ASSEMBLE ITSELF!

Yes, it's true. An ingenious guide pin design feature, new and exclusive with Producto, enables the die set to practically assemble itself. You can test it in Booth 396 at the ASTE Show in Chicago. *We guarantee you will be able to assemble the set blindfolded ...using just one hand!*

This is a real boon to the man on the bench. For him, a Producto die set means no more fussing to line up pins and bushings...no more need to hammer punch holder down on pins. He can start the punch holder on straight or at any angle...*and the die set puts itself together.* It never cocks, never jams.

While this new feature is special to a particular line of pins—available from all Producto warehouses soon after the Show—*all* Producto guide pins have been improved with greater press fit lengths, smoother end radii and mirror-like surface finish of 7-9 micro-inches.

Producto's new pins and new bushings* are added reasons you should call your nearest Producto branch for precision die sets...fast. Be sure to see these important developments in Booth 396 at the ASTE Show.

**Featured in current* Die Set Digest *with other valuable data for the diemaker and user. Write today for your free copy.*

THE PRODUCTO MACHINE COMPANY
970 Housatonic Avenue, Bridgeport 1, Connecticut
Telephone: FOrest 7-8675

***For prompt die set service, 'phone these PRODUCTO assembly warehouses:***

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| Atlanta | CY 7667 | Detroit | LI 6-7600 | Newark | MI 2-1773 |
| Chicago | ES 8-3307 | Kansas City | BA 9033 | Philadelphia | MO 4-1010 |
| Cleveland | SU 1-6158 | Los Angeles | TR 9826 | Rochester | GL 1810, GL 5357 |
| Dayton | MU 1651 | New York | WO 4-7484 | St. Louis | FR 1-3370 |

or check Yellow Pages in any other stamping center for distributors stocking PRODUCTO.

***Produce More With***

**PRODUCTO**

***Precision Die Sets***

CIRCLE INFORM-A-GRAM KEY NO. 53

# ARE YOU SURE YOU'RE GETTING THE *MOST* OUT OF EVERY STAMPING DOLLAR?

THERE'S a way you can be sure, if you'll apply a few simple questions to your own operation. Are you getting the best quality, delivery, accuracy you can expect? Are your tools lasting long enough? Is tool storage overhead eating up the profits? Are you faced with too much idle press time?

These things can mean you'd be better off by buying your stampings from a high quality outside source like Laystrom. You get better stampings from Laystrom, faster, and with less headaches. Our technical men work with stampings all the time. It's our specialty. Our years of experience assure you that your stamping problems will be solved in the most economical way. We take advantage of all possible opportunities to do every job with the fewest possible steps, creating savings in labor and material *which are passed on to you in the form of lower unit costs.*

On your next job, let us know your requirements and figure on them. You may be surprised at the savings and benefits we can offer you. Send your drawings today!

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☐ We are sending drawings for quotation.
☐ Have salesman call.
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TOOLS • DIES • ASSEMBLIES • PARTS DESIGN • SHORT-RUN DUPLICATING

Manufacturers of the Layco Tru-Align Die Setup

CIRCLE INFORM-A-GRAM KEY NO. 54


. . . Book Reviews from Page 52

METALS HANDBOOK, 1955 Supplement, by 179 specialists. Published by the American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio, 1955. 208 pages, Price $6.00 to non-members.

Production men and engineers concerned with production will find that the majority of the 21 articles in the "Metals Handbook, 1955 Supplement," deal with subjects of direct concern to them. The book covers a wide range of metalworking subjects, grouped into sections devoted to Metals and Applications, Design and Application, Processing and Fabrication, and Testing and Inspection. Nineteen technical committees with a total of 179 author members contributed to this volume.

Subjects likely to be of immediate interest to production men are the five articles on selection of metals; those on surface finish and selection of electroplated coatings; the six on heat treating, as well as the articles on metal cleaning costs and selection of welding electrodes in the third section; and the article on radiography.

The articles devoted to selection deal with topics such as speed of forming, lubrication, tolerance requirements, prevention of galling, quantity of parts, relationship of design and fabrication to performance in service, and with the cost of tooling and other cost factors. Processing costs are considered in 13 of the articles.

Two parts on Metals and Applications, "Selection of Sheet Steel for Formability" and "Selection of Material for Press Forming Dies," are new subjects for the ASM Handbook.

In all, there are 214 tables, 256 charts, and 411 illustrations in the book.

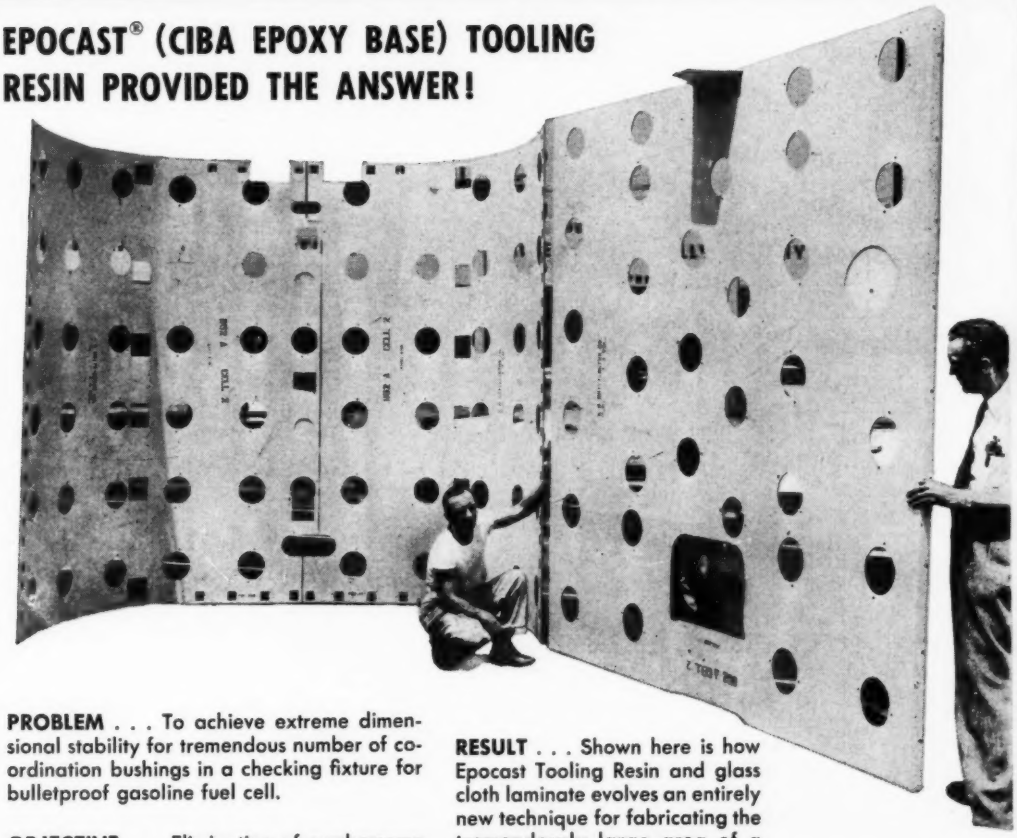
MICROSTRUCTURES OF DIAMOND SURFACES, by S. Tolansky, Ph.D., D.Sc., F.R.S. Published by N.A.G. Press Ltd., London, 1955. 127 pages, Price in United States, from Huebner Publications, Inc., 1975 Lee Rd., Cleveland 18, Ohio, $8.50.

Some of the traditionally accepted facts about diamond surfaces have been contradicted by Prof. Tolansky since he began studying the gem in his laboratory. His recent observations are described in "Microstructures of Diamond Surfaces." He reports, for instance, that tradition has it that diamonds have a perfect cleavage in particular directions. From optical studies of cleavage surfaces he says that "the cleavage is optically very far from perfect except in one type of diamond."

. . . *Continued on Page 56*

"IDEAS
in the making with C I B A Plastics"

**EPOCAST® (CIBA EPOXY BASE) TOOLING RESIN PROVIDED THE ANSWER!**



**PROBLEM** . . . To achieve extreme dimensional stability for tremendous number of coordination bushings in a checking fixture for bulletproof gasoline fuel cell.

**OBJECTIVE** . . . Elimination of cumbersome old method of using wood checking fixtures.

**RESULT** . . . Shown here is how Epocast Tooling Resin and glass cloth laminate evolves an entirely new technique for fabricating the tremendously large area of a fixture of this type.

*Epocast Resins, the key to the solution of the foregoing tooling problem, are the products of Furane Plastics, Los Angeles, California. For further information, send coupon below.*

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ARALDITE® Epoxies

CIBA COMPANY INC. PLASTICS DIVISION TP-3
627 Greenwich St., New York 14, N. Y.
Please send me information on
☐ EPOCAST RESIN
☐ Also, data on CIBA Epoxy Resins
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COMPANY_____ TITLE_____
ADDRESS_____

CIRCLE INFORM-A-GRAM KEY NO. 55

an engineer wants to know

MEMO:

TO: Purchasing
FROM: Production Engineering

Tom—
With a little outside help, I think we could ream and bore those castings in one operation—with gun drills.
Would you get a Chicago-Latrobe engineer in for consultation? I hear they are best in that field. E.T.

Much is new with gun drills. They are being used today on a variety of applications unheard of a short while ago. So much has happened—so fast—that it has been difficult for many of the most expert technicians to keep fully informed. A good place to get sound advice on the use of gun drills in any plant is from a Chicago-Latrobe service-engineer. They are pioneers both in production of finer tools and in development of techniques for their use. Call C-L soon . . . without obligation, of course.

Chicago-Latrobe

CARBIDE TIPPED GUN DRILLS

DOUBLE CIRCLE TOOLS

Part of the Chicago-Latrobe COMPLETE line . . . available through service-minded Industrial Distributors.

CHICAGO-LATROBE
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DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES • SPECIAL TOOLS

Ask for Circular 200

CIRCLE INFORM-A-GRAM KEY NO. 56

. . . Book Reviews from Page 54

Sixty pages of remarkable illustrations (143 photos in all) show unusual microphotographs of the surfaces of natural, etched, and polished diamonds, as taken by the author. From them, fundamental deductions can be made regarding the nature of diamond surfaces and the growth of the diamond.

While the characteristics of diamond surfaces as found by the author are the major consideration, space also is devoted to descriptions of the optical techniques utilized in obtaining data on diamonds. These optical techniques enable height or depth features as small as 1/25-millionth of an inch to be resolved, as well as effective magnifications in depth of half a million times to be made. Minute diamond surfaces appear as the skyline of Manhattan in these photos.

## Four Carbide Sales Groups Established

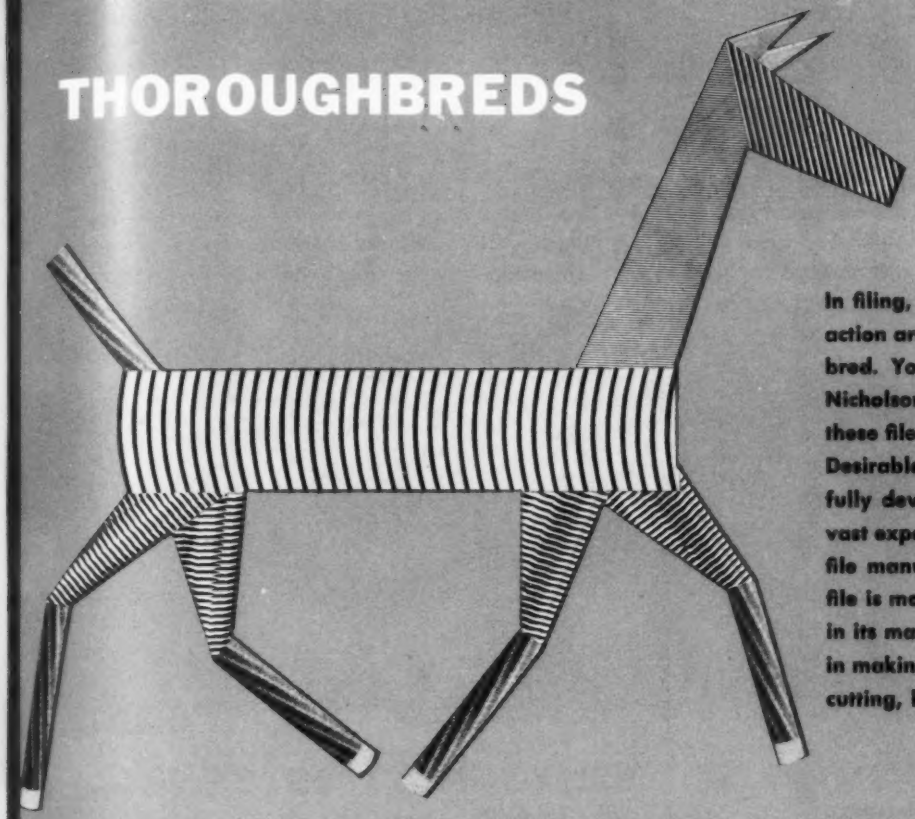
Carboloy Department of General Electric Co., Detroit, has reorganized its sales group by establishing four sales organizations for carbide products and a separate unit for permanent magnets.

In the new organization, J. D. Kennedy, formerly head of the South Central district, is manager of component sales; F. J. Staroba and A. E. Glen continue as managers of cutting tool and die sales, respectively; R. F. Parker is manager of mining sales; and M. E. Hartl continues as manager of magnetic material sales. With the exception of Hartl, located at Carboloy's Edmore, Mich., plant, all make their headquarters in Detroit.

In his new duties, Kennedy is responsible for sales of carbides, Hevimet, vacuum melted and related products for uses as structural components to resist heat, wear, and corrosion. Staroba is responsible for sales of carbide cutting tools for machining metal, wood, and plastics, both direct to users and through industrial distributors.

Glen's new responsibilities include the Pittsburgh office and die service shop as well as sales of fabricated dies and die metal to fabricators and users.

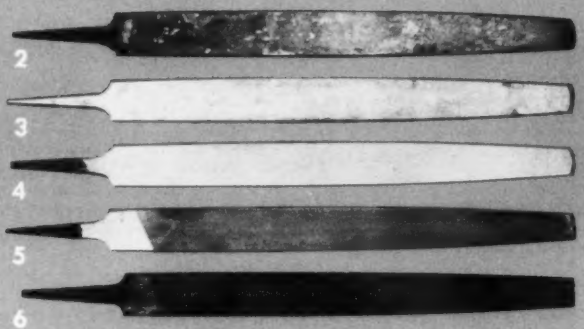
# THOROUGHBREDS



**In filing, too, stamina and smooth action are attributes of the thoroughbred. You'll find them in every Nicholson file. The "blood lines" of these files go back more than 90 years. Desirable file traits have been carefully developed, drawing on all the vast experience of the world's foremost file manufacturer. Grooming of the file is most painstaking at every stage in its manufacture. Nothing is spared in making every Nicholson file a fast-cutting, long-lasting thoroughbred.**

## How a thoroughbred file is born

1



2 3 4 5 6

7

**1 Steel blank.** Much metallurgical research goes into alloying and selecting steels. After close inspection of steel from mill, Nicholson cuts blanks of right cross section (round, flat, etc.) to length.

**2 Rough shaping.** The blank is heated and forged. With triphammers and rollers, both tang and point are properly shaped, and checked for conformity with a model file.

**3 Annealing.** The blank is heated, then cooled slowly under carefully controlled conditions to make internal steel structure uniform, and accurate tooth cutting possible.

**4 Final shaping.** Annealed blanks are ground or milled to proper shape, then drawfiled to produce perfectly true surfaces for accurate, uniform teeth. All decarburization is carefully cleaned off.

**5 Forming teeth.** Fast-striking chisel displaces metal in annealed blank, raising teeth into desired pattern. For double-cut files, this operation is done twice, forming diagonal rows of teeth.

**6 Hardening.** Bath of red-hot lead raises file to precisely controlled temperature. Quenching solution follows, bringing cutting edges to maximum hardness.

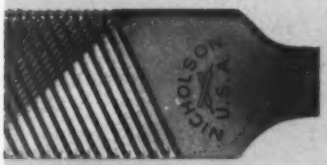
**7 Finishing.** File is cleaned and further sharpened by sandblasting. The tang is reheated for strength without brittleness. After tests by trained experts, file is oiled and packaged as one of "Twelve perfect files in every dozen."

# NICHOLSON FILE COMPANY

**Turn page for the BIG PAYOFF**

# Your Industrial Salesman will help you pick a winner from these Nicholson "stablemates"

Here are ten examples of Nicholson files that have been carefully "bred" to do specific jobs — and do them superlatively well. The right Nicholson file can reduce labor costs on your job because it works faster, and reduce tool costs because it lasts *longer*. Your Industrial Distributor's representative has specialized information on these thoroughbreds. When next he calls, be sure to ask him about care, selection and use of the right Nicholson file for your job.




**ALUMINUM "A"**
Tooth construction eliminates clogging and pinning of this "problem" metal. Shearing motion toward left gives smooth finish. Flat and Half Round shapes.

**BRASS**
Long overcut (diagonal teeth) and short upcut reduce clogging and improve traction on this slippery metal. Used with light pressure. Half Round.

**LEAD FLOAT**
Short-angle, single-cut teeth are virtually a series of stubby "blades" to shear away soft metals like lead, babbitt, copper. Light pressure produces smooth finish. Made in Flat and Half Round shapes.

**STAINLESS STEEL**
High chromium and nickel content of stainless steels wears out ordinary files quickly. These special Nicholson files, properly used, have exceptional work life. In all Regular Purpose shapes.

**FOUNDRY**
Husky, heavy-set teeth resist breaking off against fins, sprues and other casting projections. Also used for filing sharp corners of dies. Flat and Half Round shapes.

**DIE CAST**
Extra-strong teeth resist breaking off against sharp corners or projections. Also reduce tendency to clog of magnesium, zinc, similar metals. Flat, Half Round.

**SHEAR TOOTH**
Designed for rapid removal of aluminum, copper, brass, similar metals. Leaves a very smooth finish. Use with slight diagonal stroke to right. Flat and Half Round shapes.

**LONG ANGLE LATHE**
Gives cleaner shearing and clearing, cuts faster than ordinary files. "Safe" (uncut) edges avoid damaging shoulder of work. Made in Flat shape only.

**SWISS PATTERN**
For close-tolerance filing of dies, patterns, instruments, etc., these fine "specialists" come in hundreds of shapes, cuts and sizes. Made in fine cuts to exact measurements.

**SUPER SHEAR**
Cuts and smooths in one fast operation. Practically two files in one! Also breaks up filings, clears chips, files chatter-free. Made in Flat cross section only.

***Specify Nicholson "thoroughbred" files on your next order to your Industrial Distributor***

NICHOLSON U.S.A.

Write for FREE "FILE FILOSOPHY": widely used in Industry as *the* textbook on files and filing.

**NICHOLSON FILE COMPANY, PROVIDENCE, R. I.**
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

BLACK DIAMOND U.S.A.

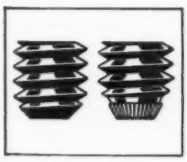
# NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

# Greater resistance to removal holds Allenpoints tighter in your products

## Tests prove that ALLENPOINT Set Screws have 50% HIGHER WITHDRAWAL TORQUE than serrated point set screws

**HIGHER WITHDRAWAL TORQUE WITH ALLENPOINTS!** In ¼" x ¼" sizes, tightened to shear point of key, Allenpoints required 75 inch-pounds removal torque. Serrated point set screws gave up their hold at only 50 inch-pounds removal torque.



**ONE MORE FULL THREAD WITH ALLENPOINTS!** Compare, and you'll find that Allenpoints have *one more full thread* than same size serrated point set screws. That means greater holding power, especially in the much-used "square" sizes.

**DEEPER, CLEANER SOCKETS WITH ALLENPOINTS!** Allenpoint sockets are *"pressur-formd"* to preserve the long fibers of the steel uncut throughout the *entire* length of the screw. This makes a deep socket of maximum strength, in which the key seats with great exactness.

**Specify ALLENPOINTS** for far greater *holding* power — the kind of fastenings that "stay put". Genuine Allenpoints and other Allen fasteners are available from your Industrial Distributor — standard items immediately, special items very promptly. Write for full information.

You want maximum holding power from every set screw in your product. Here's why you'll get that from ALLENPOINT ○ Set Screws: Allenpoints and serrated point set screws were recently compared in laboratory tests. They were the kind of tests you'd make in your own plant — random samples of each were chosen from regular stock boxes from distributors' shelves.

In each test, keys were tightened right up to the shear point — maximum tightening point for any set screw. In each test, 50% HIGHER WITHDRAWAL TORQUE was required to release the ALLENPOINT ○ Set Screws.

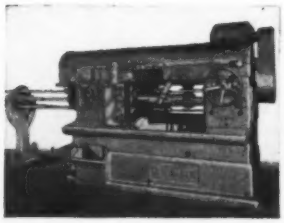
Translated into your own product, this means more dependable fastening with ALLENPOINTS.

# First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.



# Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

CIRCLE INFORM-A-GRAM KEY NO. 60

## At Your SERVICE

Mercury Piping Co., Norwood, Mass., fabricates and erects low and high pressure piping. The company's installations range from pneumatic control panel systems to the largest hydraulic presses in the world.

Precision Photomechanical Corporation has announced a new technique for marking dial graduations with an exceptionally fine degree of accuracy. The Englewood, N. J., company's method produces fractional lines and prime and nonprime numbers in any frequency for dials, complex wave forms, digital computer coding discs, and so forth.

Worn or out-of-size cutting tools can be made usable again by hard chrome plating the Duro-Chrome way. Facilities of Duro-Chrome of Chicago, Inc., Chicago 12, are used also to wear-proof metal parts and tools.

Extruders, with capacities from 1½" to 3½", for the expanded production of extruded nylon have been installed by Kemtek Corp., Newark, N. J. Currently producing a variety of sizes of circular nylon rod, the company also does development work on nylon film and extrusions. The firm works with lucite, polyethylene, and other plastics.

Various sizes and shapes of powdered metal parts are made to customer specifications by Reese Metal Products Corp., Lancaster, Pa. Trade name for the firm's powdered metal is Remet.

Crane Packing Company's complete production lapping facilities handle work from 1/16" to 16"-dia. Using their own Lapmaster lapping machines, the company can provide surface flatness to .000011" and finishes to 2 micro-inches on a wide variety of materials. The company's located at Morton Grove, Ill.

The new Fastex Division of Illinois Tool Works of Chicago now has extensive engineering facilities which are available to manufacturers of various types of components, sub-assemblies, and finish products. It specializes in the design and production of highly specialized fasteners with limited applications and fasteners which must be modified from one application to another. These include molding clips, "speednuts," quick fasteners, and stamped gears.


MARKING TOOLS AND MACHINERY

LEAVE STERLING IMPRESSIONS ON FINE SILVERWARE!

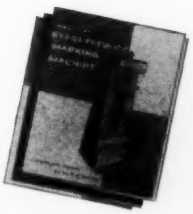
MARK INTRICATE SPOON CONTOURS WITH UNIFORMITY AND PRECISION!

Production stamping of silverware is an exacting operation. Every reject is costly! Thousands of units must be marked clearly—identically—with the last impression as legible as the first. Most blue chip companies know the importance of a quality name on a quality product; that's why they specify marking machinery and tooling by Parker.

A Parker #700 Marking Machine, tooled with a standard Parker #100 insert roll die holder and interchangeable segment type, met every requirement of precision and performance. The "cushioning" effect of the machine table, plus proper set-up, compensated for the curvature of the spoon, assuring clear, uniform production marking throughout runs in the hundreds of thousands.

MARKING PROBLEMS?

Send today for literature on Parker Marking Machines, standard and special marking tools.



THE PARKER STAMP WORKS, INC.
MARKING DIE & MACHINERY DIV.
by Parker
FRANKLIN AVENUE • HARTFORD, CONNECTICUT

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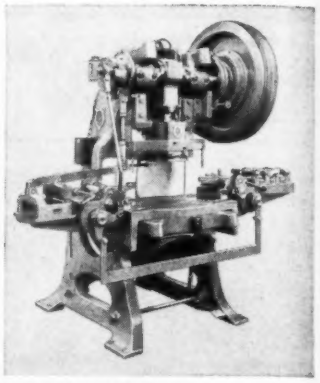
*Which one is best?*



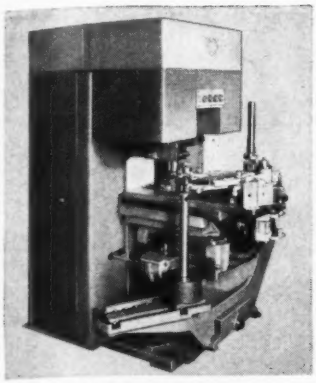
**INCLINABLE . . .**

# Combined Experience and V&O Press Now Selecting Best Press

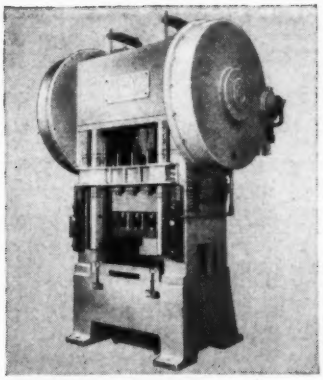
**MERGER OF HENRY & WRIGHT AND V & O PRESS** field sales organization means one source of information and assistance on the important basic types of mechanical presses. It means that you can count upon no-axe-to-grind counsel in appraising the basic type of unit best suited to your immediate and long range requirements.

You may be considering a press modernization or replacement program right now — and weighing the pros and cons of various press types. Whatever the end result you are seeking, it will pay you to consult the H & W — V & O representative nearest you. He will be glad to add his experience to yours in working out the best solution. *Why not write us for his name, or send for our digest of presses* to Press Divisions, Emhart Mfg. Co., 511 Windsor St., Hartford, Conn.

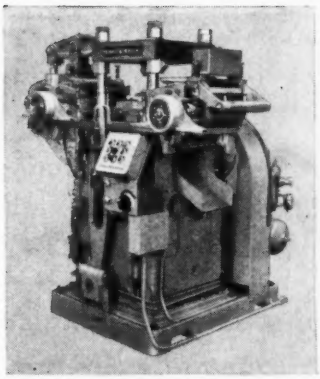
**NEW AT A.S.T.E.** V & O Blank Feeder and Stacking Unit for high speed notching machines. New V & O Straight Side Press . . . **BOOTH 509**



NOTCHING MACHINE . . .



STRAIGHT SIDE . . .



DIEING MACHINE . . .

# of Henry & Wright Yours to Use in for Your Needs

**EMHART MFG. CO.**

PRESS DIVISIONS

HENRY & WRIGHT
HARTFORD, CONNECTICUT

THE V & O PRESS CO.
HUDSON, NEW YORK

*Presses and methods that automatically reduce costs*

CIRCLE INFORM-A-GRAM KEY NO. 63

# DIE DESIGNING AND ESTIMATING

*Fourth Edition*

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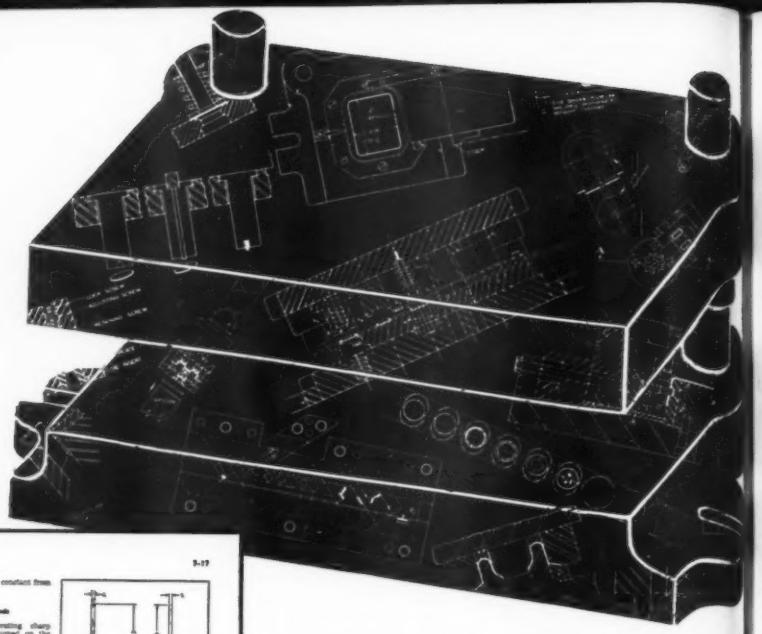

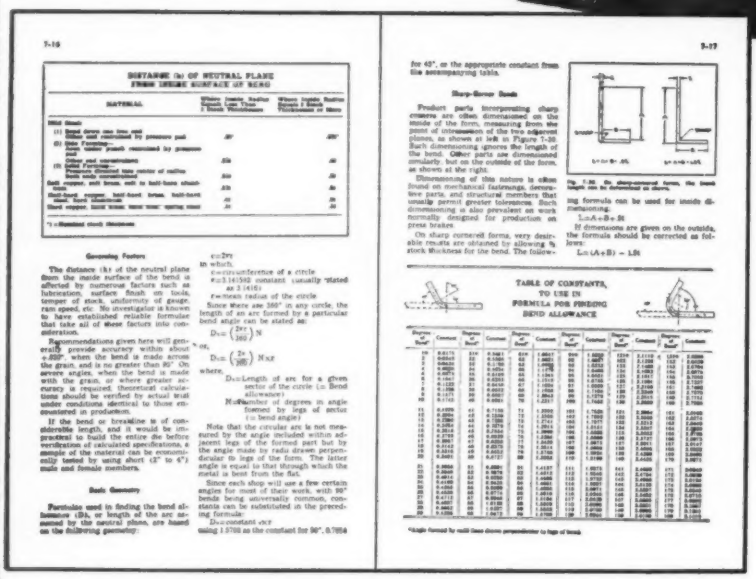

**368 pages, 26 chapters, over 400 illustrations, charts and graphs. 165 Practical Points in Die Design and Construction. Comprehensively indexed.**

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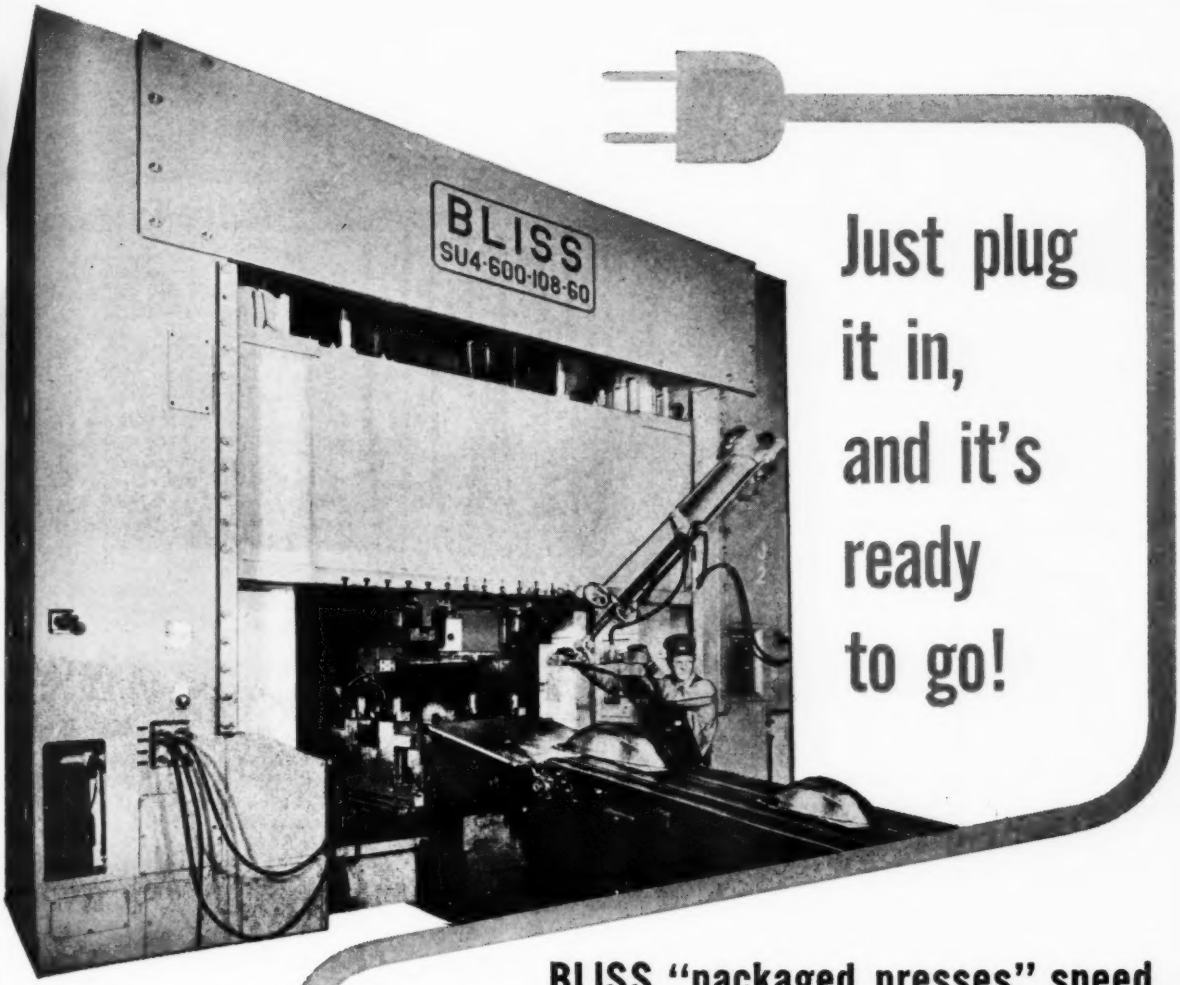


# Just plug it in, and it's ready to go!

**NEW AUTOMATION CONTROL**

This new nine-station rotary limit switch will control stops, starts, interlocks, motion, time, or recycles of auxiliary equipment. Each station can be set from 0° to 360°, can be operated either normally-open or normally-closed, and is accurate within less than 1°. Write for Bulletin 33.

## BLISS "packaged presses" speed installation and simplify maintenance

***Automation created the problem***—The dopers, kickers, lifters and other materials handling devices so popular these days brought a maze of wires and pipes in their wake. And aside from looking untidy, they slowed maintenance and proved annoying to crane operators.

***"Packaging" solved it***—Now, in Bliss' new line of presses, all the pipes and wires, and controls are built into the uprights. Each air and electrical line is tagged—simple to find, simple to fix. Controls are centrally located. The exterior is clean and uncluttered—cranes can move up close to change dies.

Bliss designers have come up with completely new two point and four point presses—both single action and multiple action. Design features include extremely rigid frames, eccentric drives, high speed clutches, extra long connections, motorized adjustments and many others. The entire line of presses is described in a comprehensive 32-page catalog, No. 11-B, just published. Copies for you and your staff are available by writing to E. W. Bliss Company

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**E. W. BLISS COMPANY, Canton, Ohio**

**Presses, Rolling Mills, Rolls, Special Machinery**

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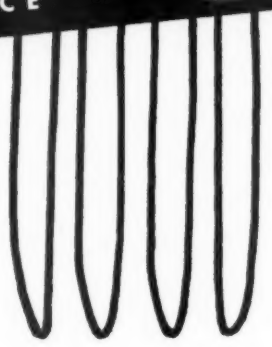
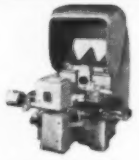
*Other representatives throughout the world.*

# DROODLES

by ROGER PRICE





*Bench Model BC-7D*

*Floor Model FC-30*

*Floor Model FC-14*

## "POTATO'S EYE VIEW OF A FORK"

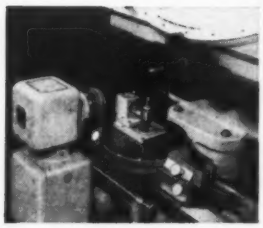
This Droodle presents several fascinating possibilities. Turned upside down, the title could be "Yeast-cake Quartet Rising to the Occasion". Best of all, though, I'd like to add little squiggly lines, and call it "Tines getting in Tune". But squiggle-drawing makes me nervous. Gee, I wish I were normal! But if I were, then my psychiatrist wouldn't have that shiny new Continental. Just goes to prove that every problem has a silver lining.

If *you* have a problem . . . concerning quality control inspection . . . here's *your* silver lining: the J & L Optical Comparator. It's an incredibly flexible precision inspection instrument that inspects and measures all sorts of parts and objects.

The J & L Comparator not only is a great aid in production-line inspection, it is also ideally suited to job-shop work. It's versatile, *easy* to operate, accurate to .0001", and makes speedy inspection a cinch. Eleven models available. Send coupon now for full information.

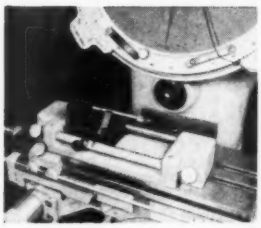
## JONES & LAMSON OPTICAL COMPARATORS

***Precise . . . Rapid . . . Flexible . . . Easy to operate***



A J & L Comparator, with special fixture and chart, easily and perfectly measures a 3-dimensional cam. This is traditionally one of the most difficult of inspection jobs.

This inexpensive J & L Comparator is precisely measuring four small parts, of different sizes, with the same setup.



A J & L Comparator can measure shoulder lengths to closest tolerance, swiftly and accurately. The fixture shown here accommodates a wide variety of parts.

# JONES & LAMSON

JONES & LAMSON MACHINE COMPANY, Dept. 710, 519 Clinton Street, Springfield, Vermont, U. S. A.

Please send me Comparator Catalog 402-C, which describes the complete J&L line of optical comparators.

name _____ title _____

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# "Commendable Comments"

*"Today the Engineer's position has become similar to that of our nation in relation to the other great nations of the world. There was a day when the United States of America could be very complacent in its isolation with vast oceans on either coast and a wealth of natural resources. But technology has shrunken our world and made us next door neighbors of practically everyone. To protect our own peaceful interests, as well as those of others, we have had to shed our cloak of isolation and assume leadership among nations. Similarly, there is no time like the present for the Engineer to move into the forefront in formulating the policies and laws of the land — the nation needs his knowledge and direction."*

—From an address by James J. O'Donnell, acting director of the Dept. of Public Improvements, State of Maryland, at the Diamond Jubilee Meeting of the American Society of Mechanical Engineers in Baltimore, Md.

*"Sooner or later all theoretical knowledge becomes universal. It follows that what counts today is not so much inventive genius as the practical ability to translate inventions into items rolling off the production line. This is a field in which Americans have always shown particular aptitude. We have it still; witness all the marvelous things which make life pleasant and easy. . ."*

—From remarks prepared by R. Adm. H. G. Rickover, U.S.N., U.S. Atomic Energy Commission, for delivery at a Dinner sponsored by Society of Business Magazine Editors, Washington, D. C.

*"Industry wants trained men and workers want to be trained. They want to be trained, not only because they will command a better salary on the labor market, but also so they may achieve recognition as skilled workers."*

—By James P. Mitchell, Secretary of Labor.

*"The lever that moves our industrial world is, of course, the lever of research and technology. It is that force, exercised today by thousands of men in hundreds of laboratories, that gives us our enduring assurance of an ever brighter future."*

—By Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Company before the annual dinner of the Delaware State Chamber of Commerce.

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CARBIDE TIPPED TOOLS

Designed and Quality-Made for HEAVY DUTY and FINISH cutting at LOW COST!

BESLY METRO standard carbide tools because of workmanship and accuracy last longer.

BESLY METRO special carbide tipped tools of close tolerances and special features — our specialty!

BESLY METRO consistent uniformity gives good results tool after tool.

STANDARDS and SPECIALS for a wide range of cutting jobs

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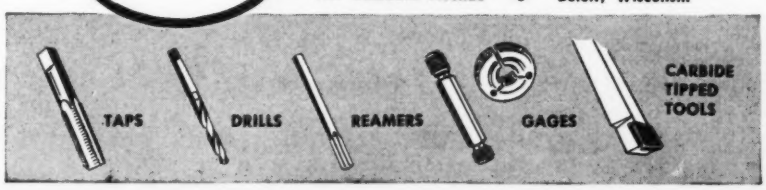
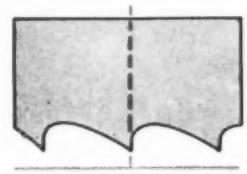



CIRCLE INFORM-A-GRAM KEY NO. 67

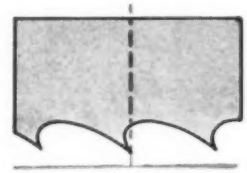
*Announcing!*

NEW DETROIT BARNES U.S.A.

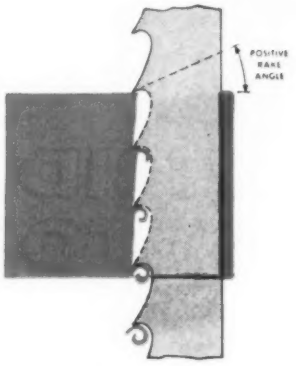
**HOOK TOOTH** BAND SAW BLADES



Conventional Skip Tooth Design



New "Hook Tooth" design showing positive rake angle.




New "Hook Tooth" design permits more bite with lower feed pressure—greater chip removal without increasing frictional heat.

**A LITTLE CHANGE MAKES A *BIG* DIFFERENCE!**

A little change does make a big difference. Barnes "Skip Tooth" band saw blades have given the best of service for years. Their quality performance in the metal cutting field has been outstanding. A slight change in the rake angle of the teeth, however, has resulted in even greater cutting efficiency.

In the new Barnes "Hook Tooth" blades, all Barnes' quality features have been retained—only the "hook" has been added to improve cutting. The new positive rake angle inclines the teeth toward the work resulting in more bite at lower feed pressure. "Hook Tooth" blades cut faster and easier. They last longer. This means real savings for you!

"Hook Tooth" blades are available through Barnes distributors in all standard sizes, 2 to 6 teeth per inch, ¼ in. to 1 in. widths and are packaged in the same familiar Barnes boxes of 100 ft. and 250 to 500 ft. economical random coils. They are also available cut to length and welded by Barnes top quality welding process.

Call your Barnes' distributor the next time you need band saw blades. Specify Barnes "Hook Tooth" for wood, plastics, paper and non-ferrous metal cutting as well as ferrous castings and mild steels with thick cross sections.

*when cutting counts* BARNES *count on Barnes*

**W. O. BARNES CO., INC.**

1297 TERMINAL AVE. • DETROIT 14, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 68


## GROWING PAINS

**The Maxwell Company** has moved to a new modernly equipped factory with larger offices and increased manufacturing facilities at Macedonia, Ohio. The move permits the company to meet the increasing demand for Hutto Adjustable Borgages, precision boring heads, boring and reaming tools, and automatic recessing tools.

◆

**Koenig Iron Works, Inc.** is building a $425,000 plant near Houston, Tex. The structure will house the general offices for several Koenig companies and the manufacturing facilities for King Winch, Inc.

◆

As part of its continuing expansion and modernization program, **Selas Corporation of America** has moved from Philadelphia to a new million-dollar plant in the suburbs. The firm develops, designs, and manufactures automatic heat treating, brazing, melting, and other heat processing equipment for the metal producing and metalworking industries.

◆

**Ford Motor Company** has announced plans for the construction of a new aluminum foundry at Listerhill, Ala. The plant will contain about 250,000 sq ft of floor space and employ about 800 persons. The foundry will use approximately 64,000,000 lbs of aluminum a year in the production of automatic transmission and engine parts. This plant will be completed in 1957 as will a Ford glass plant which is now being built at Nashville, Tenn.

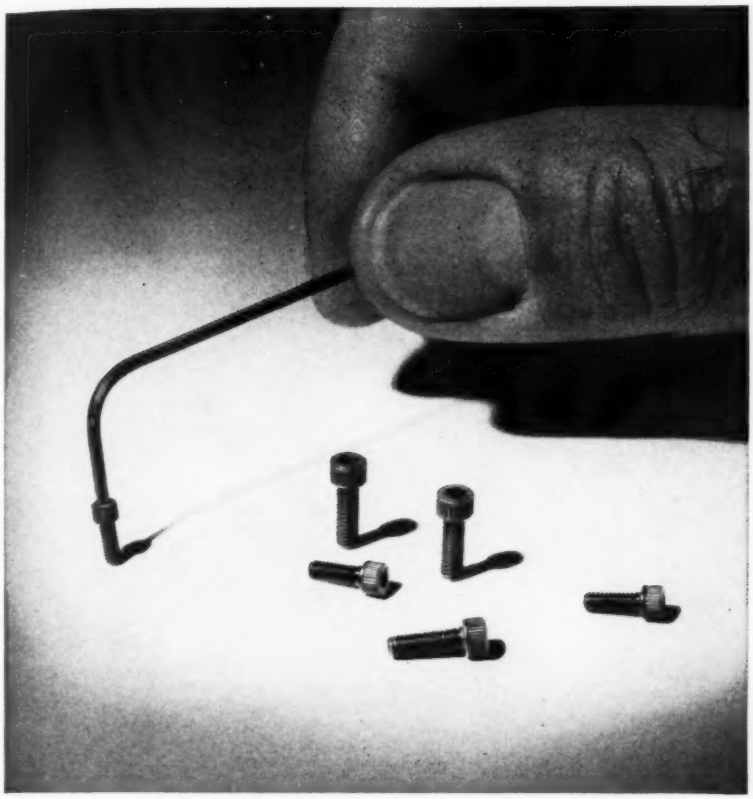
◆

A 12,000-sq ft plant expansion has been completed by **Volkert Stampings, Inc.,** Queens Village, N. Y. The company manufactures precision metal parts for the electronics industry. The new addition, which increases the firm's production capacity by 25%, will house the toolroom and engineering department.

◆

**Nelco Tool Company Inc.,** Manchester, Conn., has purchased the building which houses their branch in Berlin, Conn. This new addition contains complete machining, heat treating, and forging facilities for the production of high speed steel tools, forged single point tools, carbide tools, and special carbide and high speed steel tools.

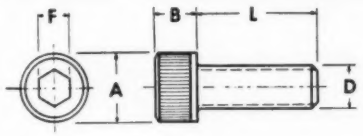
# Miniature screws aid standardization of small devices



**Standard UNBRAKO miniature socket head cap screws** are available in sizes # 0, # 1, # 2 and # 3, in heat treated alloy steel or stainless steel, at your authorized industrial distributor's. Standard lengths range from ⅛ to ½ in.

## HEAT-TREATED ALLOY STEEL

**Class 3 Fit Standard**




| | Diameter | Threads per Inch NC | Threads per Inch NF | Length | Recommended Installation Torque in Inch-Pounds NC | Recommended Installation Torque in Inch-Pounds NF | Weight per 1000 in Pounds |
|---|---|---|---|---|---|---|---|
| #0 | A .104 | | 80 | ⅛ | | 2.0 | .152 |
| | B .060 | | 80 | 3/16 | | 2.0 | .182 |
| | D .060 | | 80 | ¼ | | 2.0 | .210 |
| | F .050 | | 80 | ⅜ | | 2.0 | .265 |
| #1 | A .118 | | 72 | ⅛ | 3.5 | 3.5 | .27 |
| | B .073 | | 72 | 3/16 | 3.5 | 3.5 | .32 |
| | D .073 | | 72 | ¼ | 3.5 | 3.5 | .37 |
| | F .050 | | 72 | ⅜ | 3.5 | 3.5 | .47 |
| #2 | A .140 | 56 | | 3/16 | 6.0 | 6.0 | .42 |
| | B .086 | 56 | | ¼ | 6.0 | 6.0 | .50 |
| | D .086 | 56 | | ⅜ | 6.0 | 6.0 | .58 |
| | F 1/16 | 56 | | ½ | 6.0 | 6.0 | .70 |
| #3 | A .161 | 48 | | 3/16 | 8.5 | 9.5 | .59 |
| | B .099 | 48 | | ¼ | 8.5 | 9.5 | .70 |
| | D .099 | 48 | | ⅜ | 8.5 | 9.5 | .81 |
| | F 5/64 | 48 | | ½ | 8.5 | 9.5 | 1.03 |

## Tiny close-tolerance Unbrako screws available in standard sizes

New economies in the design of space-saving miniature equipment are possible with these UNBRAKO miniature socket head cap screws. Manufactured to timepiece precision, available locally, they save the costly necessity of designing special screws to fasten tiny parts in compact units. They're ideal for use in typewriters, calculators and computers, servomechanisms, electric and electronic equipment—and in countless other small, intricate devices where maximum reduction in bulk and weight is required with no sacrifice in strength of individual components or assemblies.

Fingers grip the knurled heads on these tiny screws positively for easy handling and fast assembly. Uniform hex sockets assure maximum wrenching torque. Controlled fillets under the heads prevent shearing of the heads. Threads are fully formed for maximum strength and exact fit. Extremely accurate head diameters permit their use in countersunk holes, saving weight by reducing the length of the screw required and making flush designs possible.

These standard UNBRAKO miniature screws are available at your authorized industrial distributor's. See him today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 36, Pa.

**See us at Booth 479—ASTE Show**

**Standard Screws** are threaded to the head. Special materials, lengths, and threaded lengths are available. One "High-Titan" UNBRAKO hex key is included with each package of 100 screws.

UNBRAKO®

**SOCKET SCREW DIVISION**

**STANDARD PRESSED STEEL CO.**

SPS

JENKINTOWN PENNSYLVANIA

CIRCLE INFORM-A-GRAM KEY NO. 69

# MANUFACTURING MEMOS

***Forms New Department . . .***

● General Electric Co. has purchased Watson Flagg Machine Co. of Paterson, N. J. This firm has been supplying gear motor components to G.E. As a result of the purchase, the Gear Motor and Transmission Components Department of G.E. has been formed with headquarters in the Watson Flagg plant.

***Name Changed . . .***

● The name of T. R. Almond Mfg. Co., Willoughby, Ohio, has been changed to Kennametal Co. of Ohio. This company was acquired several months ago by Kennametal Inc. and is being operated as a subsidiary. Mark A. Rollinson will take over as plant manager.

***Purchases Roto-Mation . . .***

● Pines Engineering Co., Inc. has bought all assets and patent rights of Roto-Mation Motors, Inc. A new corporation has been established in Greenville, Ohio, known as Roto-Mation, Inc. This subsidiary corporation will take over the manufacture and sales of the former company's principal product, oscillating torque motors.

● The annual Frederick A. Geier Award for Engineering Achievement was presented to Walter Schroeder of the engineering department of Cincinnati Milling Machine Co. He and his associates were responsible for the development and design of the HyPowermatic milling machine using the Hydramech feed drive.

● Motch & Merryweather Machinery Co. has sold its Triple M Products Division which manufactured garden tools. The purchaser was Hahn, Inc. of Evansville, Ind. The sale of this division will permit closer integration and further expansion of M & M's line of machine and cutting tools.

● American Brake Shoe Co. is planning to establish a company to manufacture precision ferrous castings in the United Kingdom. The new firm will be a joint venture of American Brake Shoe and F. H. Lloyd & Co., Ltd., of England. The plant is expected to be in operation toward the end of the year. The British company will fill the growing demand in the United Kingdom for castings for jet planes and tire molds. Bernard G. Drummond has been appointed director of the American firm's overseas operations.

**A manufacturer of screw machine products and threaded fasteners, Standard Screw Co., Bellwood, Ill., has purchased Ravenna Metal Products Corp., a Seattle, Wash., firm. Ravenna Metals is known as the developer of the Moen single-handle mixing faucet for mixing hot and cold water.**

◆

**Tork-Master Division of Harvil Corp. has sold its McBain tight shutoff valve to Master Mfg. and Development Co., producer of alloys and steel fabricated products.**

◆

**Allmetal Screw Products Co., Inc. a producer of stainless fasteners, now has a West Coast division office in Los Angeles. Julian Leventhal is in charge of the office's sales activities.**

◆

**Pratt & Whitney Co., Inc. has acquired the assets and business of a Cleveland firm, Sterling Die Co. Sterling, a manufacturer of thread rolling dies, will be operated as the Sterling Die Division.**

◆

**A newly formed company, Alloy Processing Corp., has made available to industry its facilities for slitting-to-specification ferrous and non-ferrous metals, as well as plastics. The firm located in New Hyde Park, N. Y.**

◆

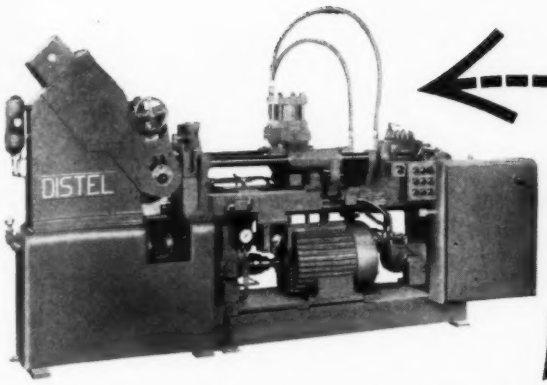
**A new aviation department, to consolidate all activities concerned with commercial business in the field, has been established by the radio division of Bendix Aviation Corp.**

◆

**A new office and warehouse has been opened in Memphis, Tenn., by The Timken Roller Bearing Co. The manager is R. P. Hall.**

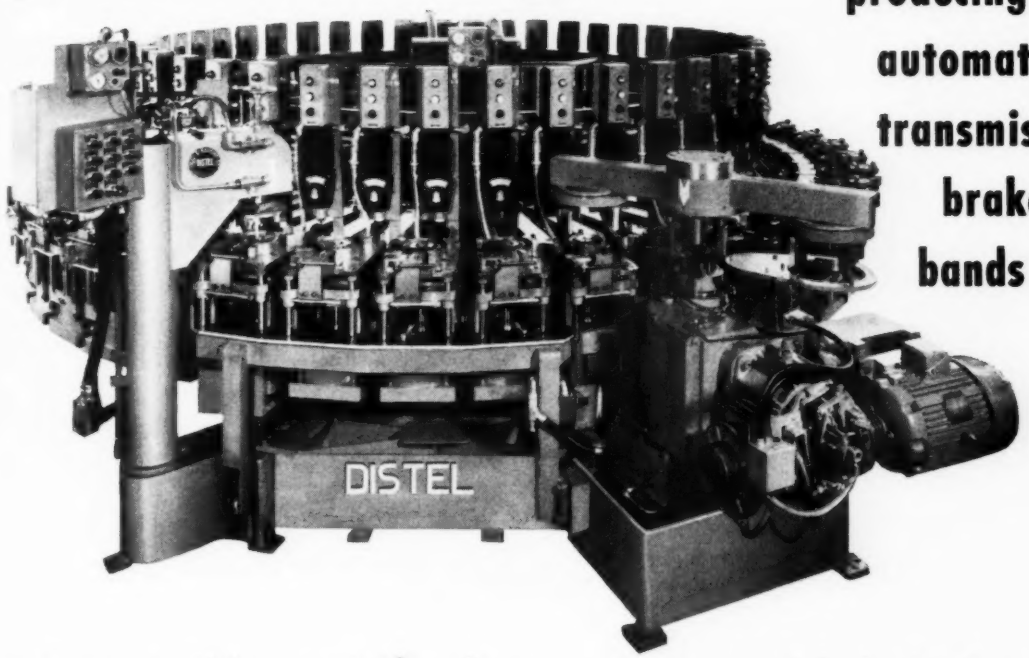
◆

**The purchase of Erwin A. Slate, Inc., machine tool sales and service engineering company, to operate as a fully-owned subsidiary of The Sheffield Corp., has been announced. Sheffield produces scientific controls for automatic production, machine tools, threading tools, and precision gages. The Erwin A. Slate firm will also act as a representative in the upper New York state area for the McCroskey Co., manufacturer of cutting tools.**




# Amazing Team FOR

**producing automatic transmission brake bands**




## a new improved roll form & cut-off machine

**constant roll forming and cut-off from coil stock**

No lost motion—no lost stock—hydraulic cut-off. Both ends are rolled, formed and cut-off, with no flat ends. Stock Feed Guide bars are hardened and ground.

**feeds to roll form, and cuts off, after the forming**

Positive locking vertically and horizontally. Heavy, much improved stock-feed runs on ball bearings. Double-action cylinders assures rigid control of lengths.

**produces perfect bands**

Holds the radius constant at both ends. No convex or concave surfaces.

**machine can be used year after year**

Readily adjusts for model changes, and diameters varying from 6" to 10".

## a new improved brake bonding machine

**the "merry-go-round" has 42 stations**

It's a rotating machine, with completely balanced weight. Ball bearing, 6' in diameter, provides stability and eliminates vibration. One-shot lubrication for the entire machine. Loading is semi-automatic. Unloading is automatic. Each station is readily accessible.

**"merry-go-round" has positive index control**

Entire machine can be adjusted to the time control and indexed slower or faster. It continues to operate even if one or more stations are down.

**bonds brake lining to steel by low voltage electric heating elements**

It bonds 360 brake linings per hour. Pressure is from an expanding air chuck. It's controlled thermostatically at each station.

**each station is a complete unit**

Each station operates with its own air cylinder, signal lights and gage.

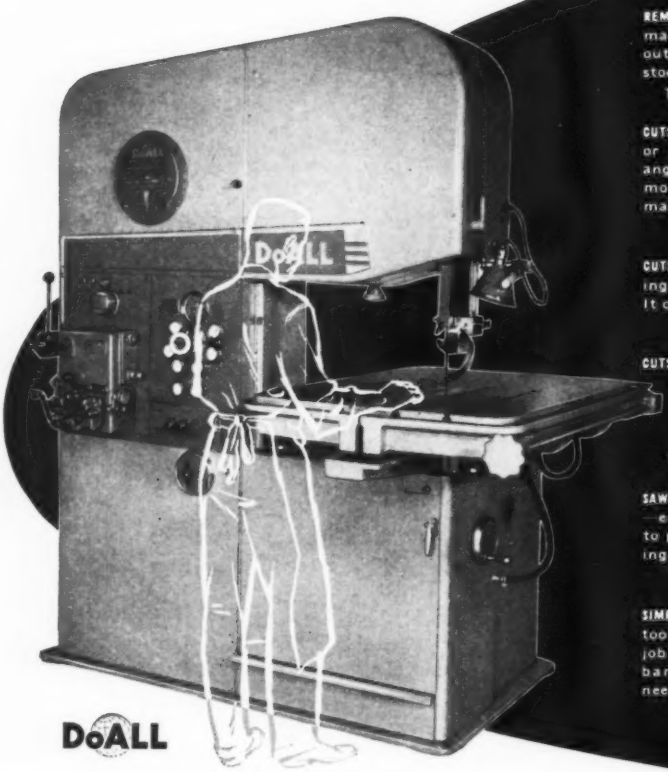
# DISTEL TOOL & MACHINE COMPANY

2585 Beaufait • Detroit 7, Michigan

DESIGNERS & BUILDERS OF TOOLS, AND SPECIAL MACHINERY

CIRCLE INFORM-A-GRAM KEY NO. 71

# How The DoALL Machining Concept Increases Productivity




**REMOVES SECTIONS INTACT**—the band machine literally "slices" parts out of the stock without reducing stock to chips!
This Saves Time and Material

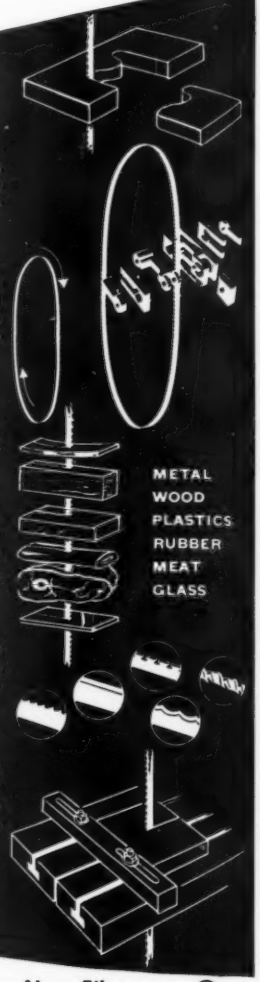
**CUTS MATERIAL TO ANY SHAPE**—inside or outside contours, compound angles or straight cuts—it has more versatility than any other machine tool!
This Reduces Investment

**CUTS CONTINUOUSLY**—no time-wasting back stroke for the saw band. It cuts all the time!
This Lowers Tool Cost

**CUTS ANY MATERIAL**—the band machine cuts everything from titanium to rubber, steel to glass, aluminum to plastics, wood to stone!
This Saves Engineering Time

**SAWS, SLICES, FILES, GRINDS, POLISHES**—employs 18 types of band tools to permit wide range of machining operations!
This Reduces Tooling

**SIMPLEST OF FIXTURING**—the band tool cuts downward holding the job to the work table—a back-up bar is often the only fixture needed!
This Reduces Tooling




DoALL

The *new concept* that makes DoALL band machines the most productive basic machine tools is illustrated in the diagrams. The cutting tool is a narrow steel band with hundreds of tool points—suspended between widely spaced tool holders. Hence the scope of its cutting action is not restricted. It is the world's fastest method of machining from solid steel. Everyday machining operations like slotting, notching, trimming, angular contour cutting, etc., as well as making special parts, can be routed to the DoALL Band Machine to gain enormous savings over former machining methods.

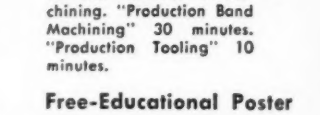
In addition, there is little or no waste of material or consumption of engineering time for fixturing and tooling with special machines.

And now this profitable machining method has a spectacular new cutting tool in the DoALL Demon *High-Speed Steel* Saw Band. There is no machining rival for its performance on DoALL Contour-matics. Cutting rates are up to ten times faster with up to thirty times longer cutting life.

We sincerely urge you to get the facts by calling your local DoALL Store. They will arrange a personal inspection demonstration of this machining concept in your plant. No obligation of course . . . it is our privilege to serve your machining needs.

**See New Films—**
revealing this new concept for cost reduction in machining. "Production Band Machining" 30 minutes. "Production Tooling" 10 minutes.

**Free-Educational Poster**

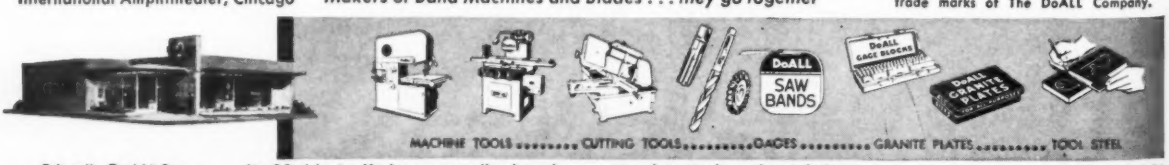


*Fundamentals of Economics in this age of machines and power are described in this Educational Wall Poster. Write for free copy.*

Demon and Contour-matic are registered trade marks of The DoALL Company.

**See DoALL at the A.S.T.E. Show**
**Booth No. 1520. . . March 19-23**
**International Amphitheater, Chicago**

**THE DoALL COMPANY** Des Plaines, Illinois,
*Makers of Band Machines and Blades . . . they go together*

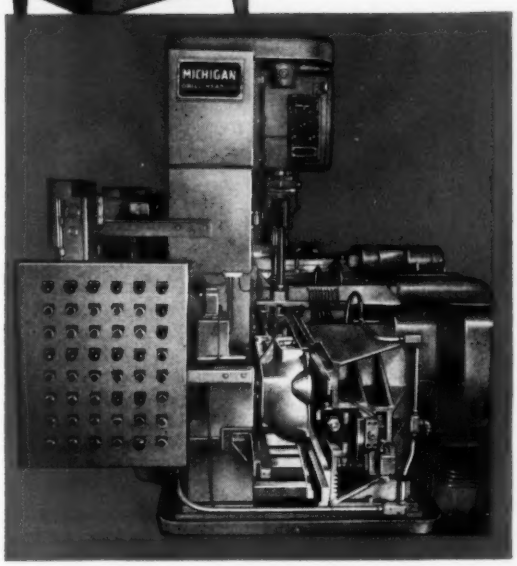



Friendly DoALL Stores . . (in 38 cities) offering personalized service . . . complete stock . . . local delivery. B-26

CIRCLE INFORM-A-GRAM KEY NO. 72

# TRANSFER MACHINE
## by MICHIGAN DRILL

COMPLETELY AUTOMATIC




**FOR DRILLING, CHAMFERING, TAPPING, ROUGH BORING—FINISH BORING**

Shown is Four Double End Machine with a transfer System moving Torque Converter Housing automatically through the machine. In addition the part is laid on a roller conveyor after all the machining operations are completed. Machine is designed in such a manner that additional stations can be added at any time. The part, when placed in the transfer track, makes a limit switch and the cycle is automatic.

for faster, More Economical Production

Michigan

**DRILL HEAD CO.** Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

CIRCLE INFORM-A-GRAM KEY NO. 73

# Lepel

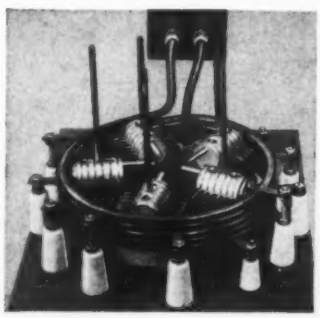
## HIGH FREQUENCY *Induction* HEATING UNITS

BRAZING
HARDENING
BOMBARDING
SOLDERING
ANNEALING
MELTING

**The Lepel line of Induction heating units represents the most advanced thought in the field of electronics as well as the most practical and efficient source of heat yet developed for industrial heating. With a background of half a century of electrical and metallurgical experience, the name Lepel has become the symbol for quality in induction heating equipment embodying the highest standards of engineering achievement, dependable low cost operation and safety.**

**If you are interested in the application of induction heating you are invited to send samples of the work with specifications of the operations to be performed. Our engineers will process these samples and return the completed job with full data and recommendations without any cost or obligation.**

## TYPICAL INDUCTION HEATING APPLICATIONS

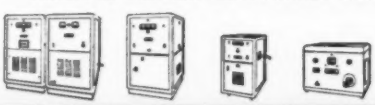


The illustration shows a lens grinding block being heated within the dome-shaped work coil. The heat generated in the metal block softens the pitch enabling the operator to remove the ground lenses and insert the next batch. The entire operation is completed in a few seconds.

A widely used application in which several assemblies, consisting of a brass body, six radiator fins and a mounting stud, are being soldered simultaneously. The production of similar parts can be further increased by using two work coils and a change-over switch.

**Electronic Tube Generators—1 KW; 2½KW; 5 KW; 10 KW; 20 KW; 30 KW; 50 KW; 75 KW; 100 KW.**
**Spark Gap Converters 2 KW; 4 KW; 7½ KW; 15 KW; 30 KW.**

*WRITE FOR THE NEW LEPEL CATALOG . . . 36 illustrated pages packed with valuable information.*



All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission.

**LEPEL HIGH FREQUENCY LABORATORIES, INC.**
55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.


CIRCLE INFORM-A-GRAM KEY NO. 74

## *Presenting . . . Representing . . .*

Vulcan Crucible Steel Co. Division, H. K. Porter Co., Inc., has appointed two distributors in the metropolitan New York and New Jersey areas: Grammer, Dempsey & Hudson, Inc., Newark, and Passaic County Steel Service, Inc., Paterson, N. J. Both companies will maintain warehouse stocks of Vulcan tool steels, backed by mill and branch warehouse stocks and by technical service for the application and use of Vulcan tool steels.

The Buffalo, Rochester, and Syracuse areas have been added by Seneca Falls Machine Co. to the territory covered by Rudel Machinery Co. Rudel headquarters are in New York. Lo-Swing lathes and special automation equipment are Seneca Falls' products.

Sales engineering service for "Em-re" dial indicators is now available in many important industrial areas. Petz-Emery, Inc. of Pleasant Valley, N. Y., manufacturers of the indicators, has appointed these district representatives: DuPage Gage, Inc., Downers Grove, Ill.; Hoffman-Baumruck Co., Philadelphia; James O. Horne, W. Rochester, N. Y.; Manufacturers Sales Co., Detroit and Grand Rapids; C. D. Proctor Co., Waterbury, Conn.; and Sterling Sales, Inc., Worcester, Mass.

The Wenning Co. of Worcester, Mass., has been named as metal stamping sales representative for a new territory created by the Worcester Pressed Steel Co. The area to be covered by Wenning Co. includes Rhode Island, part of Connecticut, and part of Massachusetts.

Swan Engineering Co. of Bloomfield, N. J., recently appointed two representatives to handle the company's full manufacturing line including pipe and tube bending, pipe coils, U bends, and other engineered tubular fabrications. The new representatives are John J. Kirk Co., Malden, Mass., covering New England; and Wm. Woodburn Co. of Rochester, N. Y., covering Western New York State.

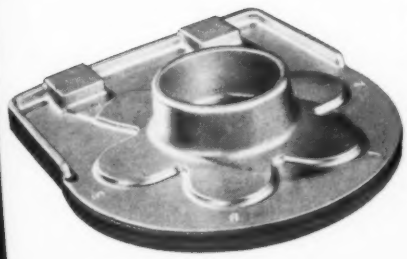
### main valve seat for fire plug

Sand-cast pegs bent easily, causing improper fire plug operation. Full line pressure could not be maintained. Machining often uncovered blow-holes causing rejects. Switched to brass forging for higher strength, dense structure, closer tolerances, reduced over-all costs.

### multi-port valve body

Porous sand-cast part caused non-detectable leaks in air and fluid system tests. Switch to fine-grained brass forging stopped trouble. Rejections, scrap, costs all reduced. Closer tolerances and better appearance achieved by using brass forging.

### base for TV signal transmission



Porosity and blow-holes in sand-cast part caused "high standing wave," or loss of power feeding into TV transmitting tower through base on end of cable. This required tearing down whole assembly at considerable cost. Switch to dense, strong forging eliminated rejects and power leakage.

### water meter lid and register box

Lid converted from sand casting to brass forging. Register box from sand casting to pressure die casting. Weight reduced greatly on both — thus lowering costs. Closer tolerances after change eliminated costly machining on the box.

# Vital Change

## from sand castings to brass forgings

# Titan

**METAL MANUFACTURING COMPANY**

Bellefonte, Pa. Offices and Agencies in Principal Cities

Titan brass forgings are more easily drilled, tapped, broached and milled than are sand castings. Fewer machining rejects result. Forgings are hot-pressed quickly, are denser, tougher and stronger. Moreover, brass forgings have a smooth beauty and warmth not obtainable in sand castings. Scrap is reduced. Some machining operations necessary on sand castings are actually eliminated by switching to accurate-dimensioned forgings. Getting down to brass tacks, what this means to you is lower costs and a better product by switching to Titan hot-pressed brass forgings.

Send us a sample, drawing, and production quantities of sand-cast assembly parts you now use. We'll quote you on changing to brass forgings.

If you want more data on Titan brass forgings, send coupon below:

Dept. U-20
Titan Metal Manufacturing Co., Bellefonte, Pa.
Gentlemen:

- ☐ Will send sand-cast part and details for you to quote as brass forging
- ☐ Please send further data on Titan brass forgings
- ☐ Have Titan representative call

Name_____ Title_____

Company_____

Address_____ City & State_____

*editorial:*

# a new high moving in for tool and die industry

PREDICTED: a potential of well over $750-000,000 in value of 1956 shipments by the contract tool and die industry. This constitutes a business barometer reading that should go a long way toward allaying fears of a business slump in the last half of 1956.

We say this because of the special dies, jigs, fixtures, molds and special machinery which account for the definite and widespread upturn in orders reported at the National Tool & Die Manufacturers Association's annual winter meeting.

These tools are now abuilding and can hardly be put to full productive use before mid-1956. They are the basic tools of metalworking and their cost is but a small fraction of their earning power in the production of end products, from precision bored and milled engine blocks to plastics components for the booming electronics industry.

The stability of the growth in orders as compared to recent years is evidenced by the nature and geography of the tooling business being placed. The association trustees reported that tooling-up for 1957 automobile models, most of which are to be drastically changed for introduction late this summer, is the largest single factor in the upturn of orders.

However, it is particularly noteworthy that of the tooling centers reporting increased orders, nearly twenty represent areas where there is no automotive predominance. This then, bespeaks accelerated new model activity calling for special tooling in such diverse manufacturing enterprises as domestic appliances, aircraft, guided missiles, electronics and business machines.

The guided missile program, which is receiving greater and greater emphasis from the armed services, will account for an increasing volume of tool and die work as the missiles make the transition from development to production.

By the same token that a machine tool is but a museum piece without the cutting tools, and jigs and fixtures that enable it to produce end products, it takes machine tools, cutting tools, and jigs and fixtures to, in turn, build machine tools.

Here again the outlook for the contract tool and die industry is greatly bulwarked by the current upturn in orders for machine tools. Both to build this new equipment and to put it to work, special jigs, fixtures, gages and dies are needed.

A final sidelight from the NTDMA meeting focuses attention on one cloud on the industry horizon. There is a scramble over the country to find tool and die workers. There is a great need for more apprentice training programs and the association is hard at work on ways and means to attract and train more boys.

Even though the generally prevailing limit is one apprentice to eight journeymen, this ratio is not being maintained across the board. And if it were, it would not assure a sufficient influx of new manpower to the craft to offset current losses due to retirements — compulsory and voluntary.

Our expanding population/economy has us headed for a really serious shortage of tool and die making skills by 1965. One of the worthiest objectives of the NTDMA is the initiation of more apprentice training programs. Their efforts are deserving of your support. We have pledged ours.

E. Willard Pennington

MARCH, 1956 editor

# Erickson Precision Expanding Mandrels Solve Grinding Problems

Photos Courtesy Thompson Products, Inc., Clarkwood Rd. Plant, Cleveland, Ohio

## e.g. engine cylinder liners

Thompson Products, Inc., leading automotive and aircraft parts producer, originally bought Erickson precision expanding mandrels to secure better concentricity and wall thickness of a cylinder liner . . . they had formerly used single taper type expanding sleeves.

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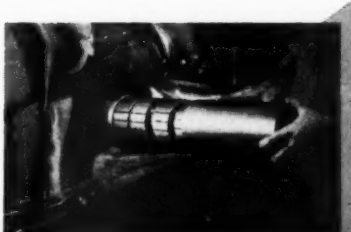

Instantaneous self-release speeds loading and unloading. Application (above) uses multiple-sleeve construction to hold work part along its entire length for utmost precision.

Bothered by a tough internal holding problem? Then let us show you how Erickson mandrels speed production, lower grinding costs. Call us or write for Catalog K.

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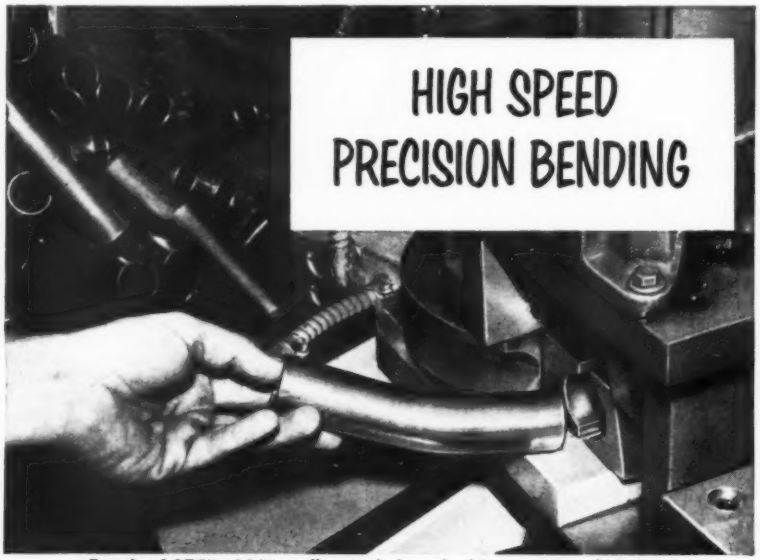


*Forming 1.375"x.028" wall annealed steel tubing at General Electric.*

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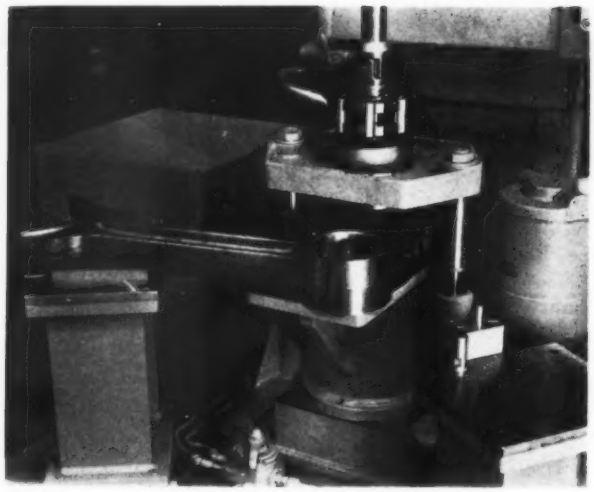


A setup for Microhoning connecting rods. In the conventional type connecting rods used in large diesel engines, the wrist pins float in thin-wall, soft-metal bushings. These bushings, in turn, float in a hardened steel sleeve that is pressed into the rod. Both the sleeve and the rod must be round and straight and have a fine finish to properly support the bushing. Model 728 Hydrohones as tooled for this job hold workpiece size and geometry to required tolerances and the finish within 4 micro-inches r.m.s. Note provision for a generous flood of coolant.

# COOLANTS FOR LOW-VELOCITY ABRADING

*by J. E. G. Kline*
Vice President
MICROMATIC HONE CORPORATION
Detroit, Michigan

ANY STUDY OF THE PLACE that coolants have in the process of generating precision surfaces by honing technology should be predicated on an appreciation of the functions performed by surfaces.

Further, an understanding of the physical characteristics of surfaces and how they are attained by low-velocity abrading (Microhoning) will assist in our discussion of coolants.

Every final machined surface is designed to perform a definite function.

Although there are many factors which must be considered by engineers in designing or processing a part, it is the generation of the work surface by machining that will determine, to great extent, whether or not the part will efficiently perform its intended function.

Whether the surface is to carry a load, act as a seal, or withstand stresses resulting from vibration or repeated flexure-efficiency is fundamentally dependent on the ability of the design and processing engineers to: a) visualize the functional characteristics which contribute most to the satisfactory operation of the part, and correctly specify them on the drawings; b) properly interpret the specifications, and process the surfaces to obtain the required characteristics.

These characteristics may be classified as:

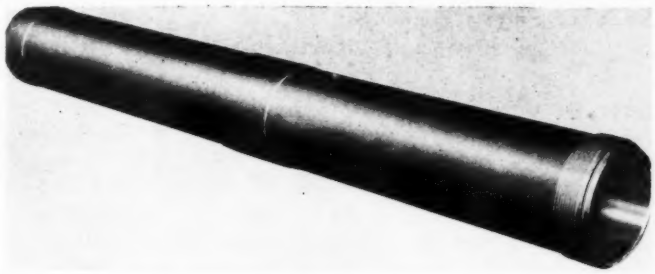
**Dimensional accuracy** — the required distance between points or faces of a part, within a specified variation or tolerance. In a cylindrical part this distance is given as the diameter. As a result of machining, however, there usually are variations in straightness and roundness of the surface . . . which change the effective size of the bore.

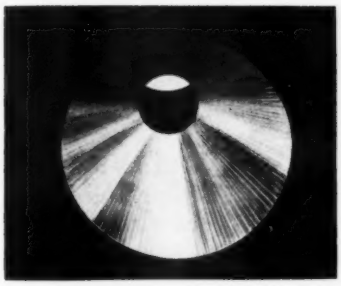
**Macrogeometry** — any flexure of the part, tool or machine caused by vibration, unstable support, improper tool or wheel dressing . . . will result in "waves" or an uneven surface contour (measuring over 1/32″ from crest to crest).

**Microgeometry** — roughness resulting from scratches left by the cutting tool (less than 1/32″ from crest to crest).

**Lay** — direction of tool marks.

**Surface structure** — the condition of the surface metal after machining. (Metal that had been burned, torn or distorted has lost some of its capability to support a load).





This artillery recoil cylinder, Microhoned by American Machine and Foundry Company, presents an example of co-directional finish dictated by the functional characteristic of a surface.
Within this cylinder a piston "floats", having nitrogen gas on one side and oil on the other. Any leakage past the piston will quickly ruin the efficiency of the mechanism.
Because silver ring seals are used, errors in geometry or roughness of the surface of either the cylinder or rod will induce a deformation or scoring of the silver, and break the critical seal.
In order that wear on the seals be held to a minimum, the surface pattern (lay) must run in the direction of piston movement. To obtain this co-directional pattern, the rotating motion of the Microhoning tool is arrested during the two finishing operations.
Special "draw finish" stones are used in the tool which is indexed slightly at the end of each reciprocation stroke. These 500-grit abrasives remove the cross-hatch lay marks. In the final operation, resilient abrasives are inserted in the tool to generate a 1.5 micro-inch finish.
Tolerances held on the finished cylinder are 0.0002" for straightness and 0.0001" for roundness.

Each characteristic has a desired tolerance, specification or condition which must be obtained through machining. The fewer the operations required to realize them, the greater the processing efficiency.

One of the attributes of the Microhoning process is its capacity to produce all the requirements of the five characteristics in one operation. Employing a low-velocity abrading technique, Microhoning is capable of generating a true functional surface on a wide variety of parts. This process has several unique features which make it entirely different from other metal-shearing operations.

The large area of contact between the long abrasive sticks and the work surface, plus controlled positive expansion of the tool combine to generate a true cylinder (dimensional and macrogeometric accuracy) by removing all high areas before the low spots are touched.

Either the tool or workpiece floats, so there is no problem in aligning each part with the spindle.

Combined rotating and reciprocating motions give full coverage of the work surface on each stroke; the same cutting path is never repeated.

The abrasives are self-dressing; sharp-cutting edges are in contact with the work surface at all times.

The low speeds used, the large abrading area, and the always-sharp abrading edges afford maximum efficiency in cutting without concentrated localized heating.

Any desired surface roughness (microgeometry) and lay may be obtained by adjusting relative speeds and changing the abrasives used. Controlled surface finish is duplicated on every surface.

Microhoning, being a stock-removing process, includes in varying degrees the same elements as other mechanical metal cutting operations. These consist of pressure-penetration, shear, cutting tool wear, and friction. Added together, these elements account for the total of the work units or energy put into the operation. That portion of the energy evolving into heat is usually regarded as frictional loss.

All of the heat resulting from machining is not from mechanical friction alone. A portion of it is due to molecular disturbance in the material. Whatever the cause, it is becoming increasingly important in precision machining operations to keep the temperature rise of the workpiece to a minimum. For this purpose, liquids commonly termed coolants are employed.

In metal cutting, heat of mechanical friction is proportional to the velocity of the chip over the tool, and to the cross-sectional area of the cut. The physics of heat resulting from molecular disturbance in the chip, as well as in the surface of the workpiece, still lies in the realm of theory. Because of the high thermal conductivity of metals, it is impossible to dissipate all of this heat at its source. Some is retained in the body of the workpiece, resulting in its thermal growth. It is therefore impor-

tant that the zone of heat generation be rapidly spread over the whole surface area of the workpiece. This insures a minimum and uniform temperature rise throughout.

In Microhoning, these ideal conditions are realized. Instead of a single cutting tool, large-area abrasives with a multitude of cutting tips are used. Each tip performs a minute cutting operation. The work done is dispersed over a wide area. Collectively, these cutting operations constitute a sizeable total whose heat is no less than that of an equivalent single-point cut. The heat is not concentrated however. Consequently, it is more readily dissipated by coolant.

If a lubricant could be maintained between the cutting tool and chip, the reduction in friction would naturally result in a reduction of heat. Similarly, the copious use of a high specific-heat liquid, such as water, would carry away much of this heat. Ironically, the better lubricants are poor heat absorbers, and vice versa.

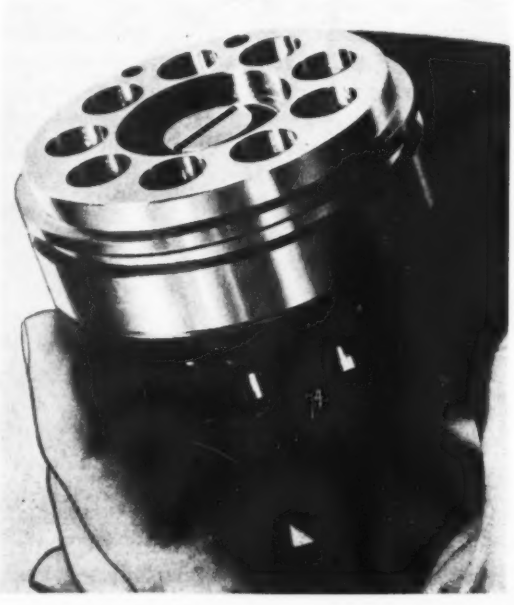
During the early days of commercial honing, kerosene was the universally-used coolant, except for materials of high-tensile strength. For these materials mineral-seal or sperm oils were used, either straight or mixed with kerosene. Although its heat-absorptive capacity is only one-half that of water, kerosene is still the principally-used honing coolant. Additives used with it have changed, particularly since the development of extreme-pressure lubricants and so-called "unmachinable" alloys. These have run the range of animal, mineral, and chemical derivation; from straight to complex compounds, and from water solubles to solids.

The most important single requisite of a good Microhoning coolant is its ability to flush away the swarf of the operation, and keep the abrasive clean and free-cutting. Whether this flushing of the abrasive is the result of the wetting, solvent, lubricating or anti-weld qualities of the coolant is immaterial. Swarf on, or loading in, the surface of the abrasive has no beneficial cutting value. Instead, it restricts or prevents cutting by the grit. This bodes against the use of viscous, gummy, or acidulous solutions, or those in which solids are suspended. Their use may cause even the softest abrasives to act hard, inefficient, and to generate extreme frictional heat.

Some experimental "flushants" have included acetic acid, acetone, alcohols, carbon disulfide and tetrachloride, chloroform, di-ethyl ether, gasoline, and turpentine. Each, however, possesses some drawback. They are either volatile, irritating, toxic, corrosive, or inflammable and are therefore not recommendable.

Neither kerosene, mineral spirits, paraffin oils nor any of the fluids above-mentioned, is capable of forming thick lubricating films between the rubbing surfaces. However, they are excellent solvents for animal, mineral, or vegetable lubricant additives. Further, the silicate bonds of vitrified Microhoning sticks

. . . *Continued on Page 116*



This 9-cylinder pump block involves the Microhoning of two different materials, hardened steel and cast iron. Additionally, the cylinder bores are interrupted by parts which present the problem of honing across edges. The cylinder honing tool has three banks of plastic guides and one bank of abrasives.

To make the bores round and straight and to prevent over-cutting at the edges of the parts, the reciprocation stroke is set so that the abrasive strokes completely through the part while the plastic guides, wearing down at the same rate as the abrasive stones, stabilize the tool.

In generating final size, geometry, and surface finish, the pump blocks are finish-Microhoned (removing 0.0015" to 0.0002" stock) to the following tolerances; diametric size to 0.000050"; roundness and straightness to 0.000025". Surface finish is held under 8 micro-inches in the steel section, and under 10 micro-inches in the cast iron.

**Machining of phosphorous bronze facilitated by carbide tooling . . . production rate increased 400%**

# Effective Use of Carbides on Automatics

*by Richard Furman*
Superintendent
STANDBY SCREW MACHINE PRODUCTS CO.
Cleveland, Ohio

THE RAMIFICATIONS of successfully operating an automatic screw machine job shop are widespread and require that management be prepared to meet many operational problems.

It is the experience in our plant that every job is an individual problem. Naturally we draw on our experience when estimating a job that might be similar to one that we have previously run. However, when unforeseen conditions arise on a job that can run production costs over our estimate, we have to be capable of meeting these conditions in order to keep within our estimate.

So far as possible we use carbide tools on all our automatic screw machine jobs. And yet there are times when one operation on a job makes it impractical to follow this practice. We recently ran a job which had three inside diameters, two rows of knurls on the circumference, and a company name stamped on the circumference. This would have been an ideal carbide tool job, but for one requirement—the stamped company name. The speed at which the automatic should run for satisfactory carbide tool operation, with the stamping die installed at one station, was too fast for producing a satisfactory stamp. As a result of this condition the whole job was run with hss tooling. The alternative in this case would have been to run the stamping operation as a second operation and the remainder of the machining with carbide tools. However, running the whole job at the slower speed with hss tools gave a better production rate than if we had used carbide tools at a higher speed and then stamped the part as a second operation.

Difficulty is frequently experienced with carbide cutoff tools because of the decrease in the

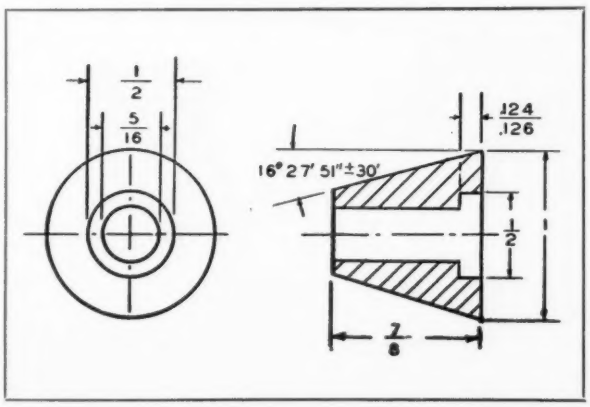
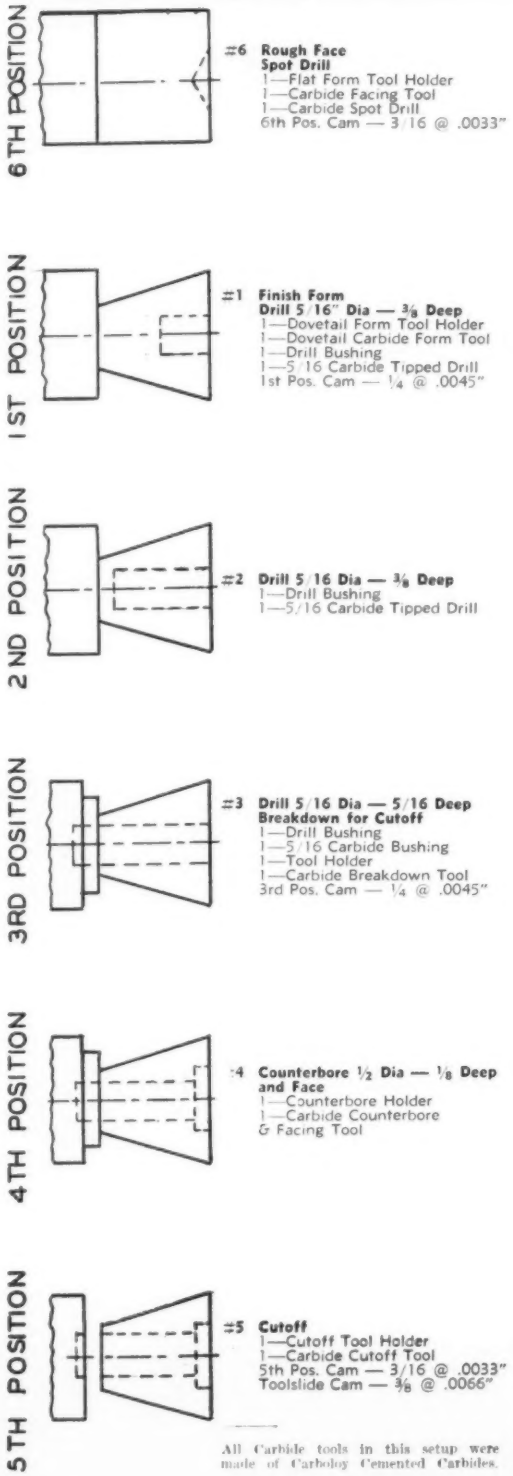



Fig. 1. Valve guide turned from 1" phosphor bronze bar on a multiple spindle automatic. All cutters and drills were carbide tipped.

**Acme Gridley — Model 1¼" RA-6**
**Name of Piece — Valve Guide**
**Phosphorous Bronze — 1" Dia Round**
**Mach. Time — 5 sec. + Idle Time.**
**Gross Prod. per Hour — 720**
**Constant speed — 1750 rpm**
**Spindle speed — 686 rpm — 170 sfsm**
**Spindle Gears — 34-42 Low Range**
**Feed Gears — 60-40-56-44**
**6 - 1" Dia Round Collets; 6 - 1" Dia Round Pushers; 6 - 1" Dia Round Spool Bushings**


6TH POSITION
#6 Rough Face Spot Drill
1—Flat Form Tool Holder
1—Carbide Facing Tool
1—Carbide Spot Drill
6th Pos. Cam — 3/16 @ .0033"
1ST POSITION
#1 Finish Form Drill 5/16" Dia — 3/8 Deep
1—Dovetail Form Tool Holder
1—Dovetail Carbide Form Tool
1—Drill Bushing
1—5/16 Carbide Tipped Drill
1st Pos. Cam — 1/4 @ .0045"
2ND POSITION
#2 Drill 5/16 Dia — 3/8 Deep
1—Drill Bushing
1—5/16 Carbide Tipped Drill
3RD POSITION
#3 Drill 5/16 Dia — 5/16 Deep Breakdown for Cutoff
1—Drill Bushing
1—5/16 Carbide Bushing
1—Tool Holder
1—Carbide Breakdown Tool
3rd Pos. Cam — 1/4 @ .0045"
4TH POSITION
#4 Counterbore 1/2 Dia — 1/8 Deep and Face
1—Counterbore Holder
1—Carbide Counterbore & Facing Tool
5TH POSITION
#5 Cutoff
1—Cutoff Tool Holder
1—Carbide Cutoff Tool
5th Pos. Cam — 3/16 @ .0033"
Toolslide Cam — 3/8 @ .0066"

All Carbide tools in this setup were made of Carboloy Cemented Carbides.

sfpm speed as the tool approaches the center of the bar stock. The bar stock face at the cutoff will start to change to a whitish color at the point where the speed drops below the most efficient sfpm speed for carbide tool cutting.

In order to take advantage of the high cutting speed with the carbide cutoff tool, we recently set up a job with two cutoff tools on the cross slides. The first was a carbide cutoff tool which cut to the point where the decreasing sfpm became critical. The second cutoff tool was of hss. This came in and finished the cutoff at the lower surface speed. This combination of cutoff tools has proved very satisfactory for taking advantage of high cutting speeds with carbide cutoff tools.

There are many little tricks we have learned about the use of carbide tooling during our gradual changing from hss to carbide tooling.

A good example of changing from hss to carbides is found in a phosphorous bronze job we have run. A sketch of the part, a valve guide, is shown in Figure 1. Close tolerances had to be held, particularly on the angle 16°27'51" where ±30' was the limit.

The job was first set up on an Acme-Gridley 1¼" RA-6, 6 spindle automatic using hss form tool, drills, cutoff tool, counterbore, and facing tool.

The material was 1" phosphorus bronze bar stock. The part was specified to be ⅞" long turned on an angle from 1" dia on the large end to ½" on the small end, making an angle of 16°27'51". An inside diameter had to be drilled through the part and a ½" dia counterbore, ⅛" deep with a tolerance of ±.001", bored in the large end. The operation speed was set at 497 rpm, with 130 sfpm and .0015" feed on the form tool. This speed gave us a production rate of one piece every 20 seconds, plus idle time, or approximately 180 pcs/hr. Soluble oil was used for coolant.

This rate of production was not fast enough to meet the customer's requirements with the result that we retooled the job with carbides; that is, the form tool, drills, cutoff tools, counterbore, and facing tool were all carbide tipped.

The operations performed at each station are shown in Figure 2. The carbide tooling, spindle speeds, gearing and camming data are given for the operation at each station.

**Fig. 2. Sketches show the progress of the machining cycle and represent the finished condition of the workpiece at each station.**

With the carbide tooling it was possible to increase the speed to 686 rpm, which gave us 170 sfpm and permitted a feed of 0.0045" on the form tool. With this carbide setup and increased speed our rate of production increased to a finished part every 5 seconds plus idle time, or approximately 720 pcs/hr.

The finish that was required on this job and the tolerance of ±30′ on the angle of the part presented a unique problem in tool geometry. We used a dovetail form tool holder with a 12° angle, formed on the vertical front face as shown in Figure 3. Thus, a tool ground with a 12° back rake would bring us back to 0° or no back rake. We therefore ground the tool with a 22° angle which gave us a 10° effective back rake or hook. The front angle or clearance of 12° was taken care of by the tool holder's 12° angle. We always hone our tool cutting edges for good surface production and extension of tool life.

Although a tool can be designed according to the recommendations of the best authorities, there are conditions often existing which affect the satisfactory operation of the tool. It can be the machine on which the tool is to be used, it can be the material, or it can be in the setup, that is, the height of the tool. This should be from .005 to .010" above center.

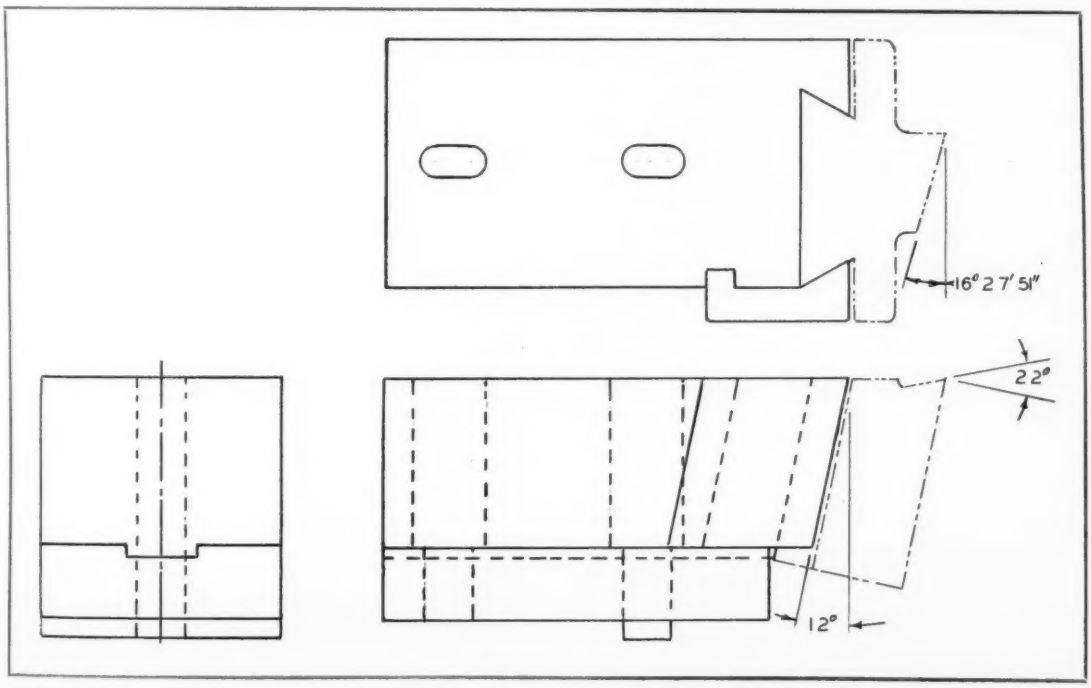
Since the proper height setting of the tool is a very important factor in the successful operation of a job, we found it advantageous to develop a height setting gage as shown in Figure 4. The small column, either of round or hex stock, is adjustable up or down and is secured in place by a set screw. The operator sets the column to the tool height desired by means of his micrometer, taking his reading from the underside of the gage base to the top of the column.

The gage is then placed on the cross slide and the tool set to correspond to the height of the gage column.

This method has replaced the procedure of removing the tool holder from the cross slide and setting the tool height by measuring from the underside of the tool holder to the top of the tool with the micrometer. The principal difficulty with this method is that inaccuracies creep in if a chip happens to be lodged on the cross slide.

After the setup on this job was completed, we had to make some adjustments. However, a slight change in the back rake angle, made to improve the finish, changed the angle on the part. Also a change in the height of the tool of .001" changed the angle on the part as much as 30′. Thus back rake angle and height of tool setting were adjusted until the angle was held within the tolerance of ±30′.

**Fig. 3. The 120° tool holder and form tool with 22° back rake used to turn the workpiece angle of 16° 27′ 51" at the 1st position are represented in this sketch.**



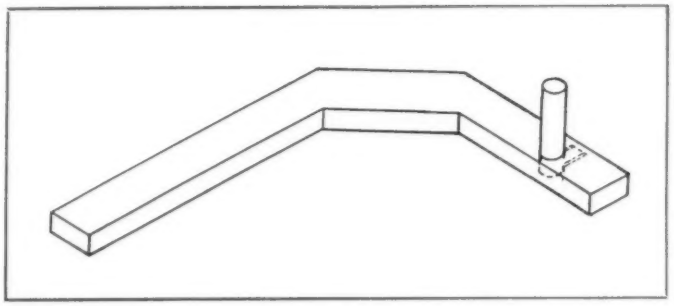


**Fig. 4. Gage used in setting cutting edge height of the form tool. This gage facilitates and speeds up the tool setting procedure.**

The application of coolant is a very important part of automatic machining with carbide tooling. The generation of excessive heat in a machining operation is to be avoided as much as possible because it has a deteriorating effect on the cutting edge of the tool, causing it to check. Excessive heat generated in the workpiece also is to be avoided, because, as it heats up it will expand, and as it cools it will contract, thus this shrinkage factor definitely affects the finished dimensions of the part.

Applying coolant in flooding proportions, rather than under high pressure, is very effective in dissipating heat from both tool and workpiece. This is a practice we have followed very successfully. However, it is not a cure-all to prevent excessive heating, because other conditions can develop to cause heating of tools and workpiece. Since we use carbide tools wherever possible, we have found it advantageous to install our own carbide brazing and grinding department. It is only occasionally that we have to have a carbide tool ground outside, and that is when the requirement of the tool is beyond the scope of our equipment and the volume of tool grinding does not warrant the expenditure for the necessary diamond wheels.

The deciding advantage in maintaining our own carbide tool department is that downtime on our machines is held to a minimum. Downtime depends on whether it is just a change of tools on a long run job or on a short run where only one set of cutting tools has been made up. It is possible that some grinding done by an outside shop, specializing in carbide grinding, would be done at a slight saving in cost, but if a machine should be down while the tools are sent out to be ground, then the outside grinding service could be quite expensive.

With the services of this carbide tool department available, we are very particular about keeping our cutting tools sharp and in good condition, because a dull tool is one of the causes of excessive heating and furthermore a dull tool does not produce a satisfactory finish.

Inasmuch as each job is an individual problem it is not always possible to obtain satisfactory turning results when following standard recommendations for tool geometry. It is not infrequent that modifications of a few degrees on the side clearance or front clearance (hook angle, positive or negative) will be the difference between acceptable workpieces or an undue amount of scrap. The success of such modification will depend on a cut-and-try procedure or on past experience in meeting a tough job.

It is our experience that in setting a carbide turning tool .005″ to .010″ above center will avoid chatter and tool breakage, also we do not jog a machine when setting a tool as it is possible to break a tool cutting edge in doing so.

Our experience and research has taught us some important characteristics about the use of carbides in tooling automatics.

It is important that the proper grade of carbide be used in making up solid or carbide tipped tools. There is a definite difference between the grade of carbide to be used for roughing and finishing cuts. We have had the benefit of advice from the Carboloy Department of General Electric Co. in selecting the proper grades to be used for specific operations.

In setting up our automatics with carbide tools we make sure that the tools do not dwell against the workpiece any more than enough to complete the cut. We feed the tools into the work and back them out at once at the end of the cut. This practice keeps the cutting edge sharp longer and therefore less tool grinding is required, or in other words, more parts are produced per grind with a better finish, and thus machine downtime is kept to a minimum.

When we adopted the policy in 1942 of using carbide tooling wherever possible on our automatics we realized that the most modern and sturdy machines were necessary to cash in on this policy. Today our automatics are all modern Acme-Gridleys. This combination has contributed to a large extent to the high rate of production we have been able to attain.

**Development of New Adhesive with Unique Properties Expected to Accelerate Industry's Acceptance of**

# ADHESIVE BONDING AS A STRUCTURAL JOINING TECHNIQUE

ADHESIVE BONDING by means of new thermoset polymers developed by General Mills, Inc. has recently brought the structural joining technique into greater prominence. One specific application, the bonding of a stainless steel hub to a brass cam in a radio receiver tuning mechanism is now being made at the company's Mechanical Division following USAF testing and approval. Official military sanction of structural adhesive joining in such an application has served to call attention to the exciting properties of the new polyamide-epoxy material.

The changeover from soldering to adhesive joining of these two parts has had immediate and positive effects on production and costs of this assembly.

Under the old method, an operator press-fitted the hub into the knurled hole in the cam by means of an arbor press. Then came a fluxing operation. After that, in a second operation, the hub was ringed with solder, necessitating heating of the dissimilar metals to the required 450° C in the contact area. Since the expansion rate of the brass was four times that of the stainless steel, the assembly warped slightly on cooling. Careful, time-consuming straightening operations were necessary to bring the assembly tolerances within the specified close limits. Only 25 assemblies could be completed per hour.

With the new process, a thin coating of the polyamide-epoxy adhesive is placed on the hub before the arbor press is used to make the fit. The assembly is then merely placed in a 200° F oven for 15 minutes of curing. Since no excessive heating is required, there is no distortion of finished parts and no necessity for extra machine straightening operations. Production has been increased from 25 to 500 assemblies per hour, through use of the new adhesive. The saving in production costs the first 12 months is expected to run $25,000 above all tooling.

The new polyamide-epoxy resin uses one of a family of polyamides developed by General Mills, Inc., and sold under the trade mark "Versamid." The company does not manufacture epoxy resins. Neither does it sell adhesives. Its chemists, working originally toward new uses for vegetable products, developed polyamides with superior qualities for the flexible packaging of foods. The advantages of these polyamides encouraged further efforts in finding new applications and in developing more resins of the same general type. The result is a whole family of Versamids, each with its own special characteristics and alloying properties. A number following the trade mark indicates a particular Versamid formula.

Versamid 115, the formula used in the structural adhesive application described, is one of the newest additions to the General Mills line of polyamide resins. When blended with a fluid-type epoxy resin and with the addition of an appropriate type and weight of filler material, the mixture becomes an adhesive of exceptional properties. It is believed that its potential in industry has only begun to be realized.

The new Versamid-epoxy structural adhesive should not be confused with other adhesives utilizing polyamides. Neither should it be mistaken for amine-cured epoxy adhesives. Both these have excellent properties in their own right; yet, each has its own limitations as a structural bonding material. The Versamid-epoxy combination combines the best features of both resins and, in addition, displays excellent and superior characteristics all its own.

**ADHESIVE GOES ON.** With aid of rotating fixture, it's a simple matter for operator with gun to apply Versamid 115-epoxy adhesive to O.D. of stainless steel hub. When second brass cam is pressed on, it will pick up enough adhesive to seal the two parts permanently in place.

These inherent superiorities include: (1) tenacious adherence to a wide variety of materials, including metals, glass, plastics, wood, ceramics, concrete, leather; (2) curing without necessity for toxic, volatile, explosive or temperature-sensitive agents; (3) curing at moderate temperatures; (4) adherence over a wide temperature range; (5) excellent resistance to mechanical shock or impact forces; (6) high resistance to severe environmental conditions; (7) ease of preparation for use, without need for solvents; (8) longer pot life or working time.

The General Mills Versamid-epoxy structural adhesive is a "two-package" system; the two resins are mixed shortly before use. Both resins are fluid. The natural "tacky" nature resins are of fluid type. The higher viscosity of Versamid/epoxy combinations produces a natural tackiness that helps hold two parts

**QUICK AND EASY.** With adhesive-carrying end down, hub is about to be pressed through second cam; already in position on fixture. Spacer, just above second cam, will hold the two cams correct distance apart. When adhesive cures, assembly will be bonded together more strongly than if soldered.

together until curing occurs. By the addition of thixotropic agents, this adhesive blend may be made completely non-flowing and yet have excellent spreading or troweling properties.

In mixing, the two resins appear to merely undergo physical blending. However, a definite and complicated chemical reaction does occur—one which results in the formation of a three-dimensional or cross-linked polymer structure. There are no by-products from this reaction.

The superior adhesive qualities of this polymer may be better understood after a comparison with an amine-cured polymer. Diethylene triamine, one of the most common of the latter, has an equivalent weight (weight of material per active unit) of 34. When reacted with an epoxy — with an equivalent weight of about 200—a strong but rigidly cross-linked polymer results. This structure has a degree of flexibility but is susceptible to impact by nature of its construction. After severe impacts, the tensile shear strength of amine-cured bonded joints goes down rapidly.

By comparison, the Versamid 115 resin has an equivalent weight in the same range as the epoxy. When reacted with the latter, a large, cross-linked polymer is formed—one characterized by extreme toughness and a lack of brittleness. The illustration on page 90 portrays graphically the relative size of the two polymers and indicates why the Versamid-epoxy structure has such superior shock-resistant properties.

The Versamid-epoxy adhesive will "set up" well at room temperatures. To achieve the absolute maximum properties, a mild heat cure is required.

Torque tests of the stainless steel-brass bond in the radio cam mentioned earlier have turned up interesting data. This data proved that the adhesive bonding was not a questionable substitute for the old soldering technique; it was definitely superior to soldering. When tested, strength of the adhesive bond proved greater than solder combined with a splined fit.

**RESISTANCE TO ENVIRONMENTAL FACTORS**

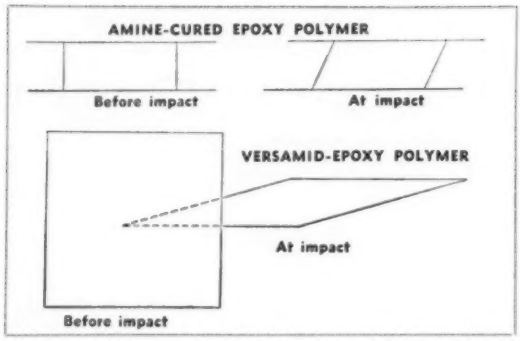
| Exposed to: | Ultimate Tensile Shear before Exposure (psi) | Ultimate Tensile Shear after Exposure (psi) |
|---|---|---|
| 250 hrs. Salt Spray | 3,130 | 2,050 |
| 7 days in Isopropanol | 3,200 | 3,000 |
| 7 days in Hydrocarbon | 3,270 | 3,300 |
| 7 days in Hydraulic Oil | 3,160 | 2,770 |
| 60 hrs. in Weather-Ometer | 2,440 | 2,680 |
| 7 days in JP4 Fuel | 3,170 | 3,000 |
| 30 days in Tap Water | 3,130 | 2,600 |

Tensile shear strength of this adhesive has proved excellent. It has been shown to vary slightly according to the fill added to the mixture. However, it is always high and in the aluminum samples used in the test averaged more than 3,000 psi. An illustration of this strength would be the suspension of an automobile of average weight beneath two postage stamp-size pieces of metal, the entire load being borne by a one to two mil thickness of the adhesive.

Tests have also shown the new structural adhesive to be highly resistant to environmental factors. While it is recognized that tests of this type are difficult to conduct with absolute accuracy, strips of aluminum were bonded together with a one to two mil coating of adhesive and every effort was made to make up a number of identical samples. After curing, these were tested for tensile shear strength, some before exposure to establish a norm and the other **after** exposure to various corrosive factors. Differences in tensile shear strengths of unexposed samples in the various categories were due to variations in the formula, as specified by the military. Results are given above.

**CURING of the adhesive bond is hastened by a 15-minute 200°F heat treatment. (For most applications, a room-temperature cure is sufficient.) Some of the radio cam assemblies shown have two cams on one hub, others have but one.**

**About 125 cam assemblies can be cured at one time. When removed from the oven, these parts are finished. If soldered, this many assemblies would have required hours of additional work to correct warpage caused by 450°C soldering heat.**




**DIFFERENCE in structure and inherent shock-resistant capacities of the amine-cured and the Versamid-epoxy polymer.**

On impact tests, the Versamid-epoxy structural adhesive proved its superiority beyond doubt. In these tests, the new adhesive was compared to the best commercial adhesives obtainable. Amine-cured epoxy adhesives lost their strength rapidly after severe shocks. The best one tested (far better than any of the others, incidentally) withstood a 40 in.-lb impact well but lost two-thirds of its tensile shear strength after a 60 in.-lb impact. After an 80 in.-lb shock, this adhesive lost more than three-fourths of its strength. The Versamid-epoxy adhesive, on the other hand, lost virtually none of its strength in any test even after an 80 in.-lb impact. In fact, in 50% of the tests the tensile shear strengths of this adhesive actually tested higher than the norm after impacts of 60 or 80 in.-lbs.

The only real limiting factor in the use of the new Versamid-epoxy material is its heat-resisting property. The adhesive is excellent up to about the boiling point of water. Above that temperature, it weakens noticeably. At the other extreme, it can readily withstand temperatures of more than -100° F. Though the ability to stand up under high temperatures is not a requirement in many applications, General Mills chemists are working now to raise that high temperature resistance. Improvements can be expected, they say.

The Versamid-epoxy blend that produces the extremely hard and tough thermosetting adhesive is but one of the mixtures possible for the Versamid 115 polyamide resin. By varying the formula, other blends can be achieved for special purposes. The material is being used in Fiberglas laminated joints, in the fabrication of honeycomb panels, and on printed circuit boards to adhere the conductor to brass or copper—to mention only a few. In addition, certain blends are used in organic coating formulas, lending a new degree of flexibility, impact resistance, weather-resistance and corrosion-resistance to paints and coatings.

Always weight-conscious and quick to investigate promising new materials, the aircraft industry is experimenting along several lines with the General Mills Versamid-epoxy structural adhesives. One end-use may be that of bonding on the aircraft skin. The new material would eliminate rivets and bothersome maintenance, is more economical, and speeds up the production line. And to anyone who expresses concern over riding in an aircraft with a glued-on skin, aircraft engineers can point to experiences of the pioneers in the bonding technique, the British. After one of their aircraft had disintegrated in mid-air and attempts were being made to reconstruct the aircraft from pieces, one fact stood out clearly to the investigating authorities: riveted sections of the airplane were blown apart; adhesive-bonded sections were still intact.

The list of actual and experimental applications for the Versamid-epoxy material is a long one. Now, many more uses will be found for this adhesive, it is believed, since it has been subjected to, and has passed, rugged Air Force environmental and performance tests in a specific application. General Mills chemists are convinced that structural bonding, of the type made possible by their new Versamid-epoxy thermoset polymers, will before many years become one of the principal means of joining materials.

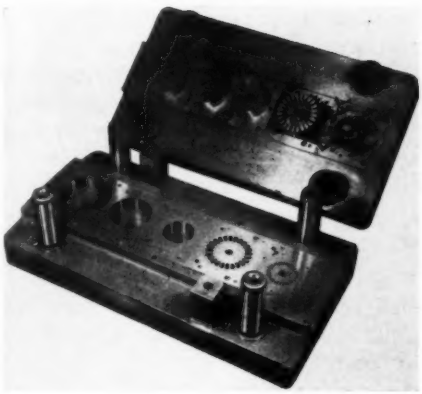
## Four Divisions Made of G & L's Main Branches

The newly-divisionalized reorganization of the Giddings & Lewis Machine Tool Co. of Fond du Lac, Wis., calls for making each of the company's four main branches a separate division.

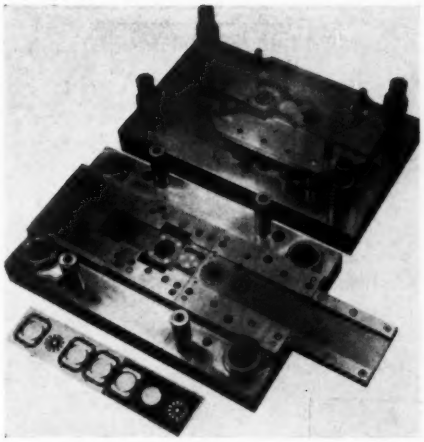
Two divisions, the G & L Hypro and the Davis Boring Tool Divisions are located in Fond du Lac. The former Cincinnati Bickford Tool Co. will be operated in Cincinnati under the name of the Cincinnati Bickford Division. The Kaukauna (Wis.) Machine Corp. will be known as the Kaukauna Machine & Foundry Division. These two divisions were acquired by G & L last September.

In explaining the changes being made, Ralph J. Kraut, president of Giddings & Lewis, said that the new corporate structure gives the company the advantages of a large corporation without sacrificing the benefits of small-plant operations in each of the divisions.

The general managers of the separate divisions are: Edgar L. McFerren, G & L Hypro Division; Allan L. McKay, Cincinnati Bickford Division; Erich C. Wussow, Kaukauna Machine & Foundry Division; and Erwin J. Kaiser, Davis Boring Tool Division.



Die stop blocks are the diemakers' silent partners. They dictate to the setup man, "enter this deep and no deeper." In his article, Mr. Urbas draws on his experience for pointers as to design details, mounting, and use of stop blocks.



# STOP BLOCKS ON DIES STOP TROUBLES

*by Ernest J. Urbas*
Superintendent—Tool & Die Dept.
THE GUARANTEE SPECIALTY MFG. CO.
Cleveland, Ohio

IF YOU WANT to make a couple of hundred dollars by spending a couple of bucks then by all means use stop blocks on your dies.

It has been my observation that a large number of the tool and die shops that make dies for the stamping industries seldom, if ever, employ the use of stop blocks on their dies.

They should, however, because stop blocks offer a guarantee of damage prevention for the builder of the die, and for the user of the die the stop blocks initiate a self-styled preventive maintenance program built in the die.

Stop blocks when mounted on dies can be defined as machined pieces of steel, mounted in such a manner on a die as to facilitate the setting of the die. These blocks can be left on the die or removed after the setup is completed; this being dependent on any additional function they serve. If they are used to bottom on during production, they are left in the die. The primary service they render, however, is to insure and simplify the setup for proper depth of entrance of the punches into the die.

You and I hear about preventive maintenance of press equipment. Yes sir, they sure are nice sounding words.

Preventive maintenance programs must be projected and enforced through the years to be of any value to the builder of dies so that the product of his labor is given an even break. While this talk of preventive maintenance is going on, let's put stop blocks on dies. Let's not be naive in our thinking that our press room equipment consists of modern, sturdy, precise, maintained, and non-abused presses.

Let's be frank and admit that we wish all presses were in tip-top shape.

Let's admit that we expect miracle performance from "beat-up" press equipment.

You might say, "Buy new equipment" but that's not the entire answer. We buy new equipment, run it night and day, abuse it and overload it. In six months time, we say, "It's worn a little bit." This "little bit" is the start of some of our biggest press room headaches.

Let's illustrate a point, a point that is usually taken for granted, i.e., the up and down play in a press. This is the looseness of fit between the main bearings, crank, connection and ball socket. Let's say that this press is sixty years

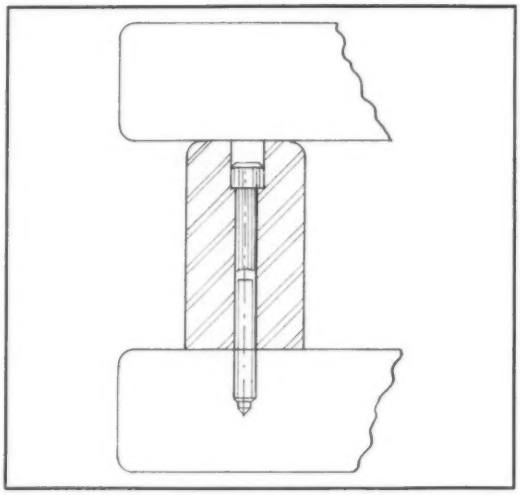
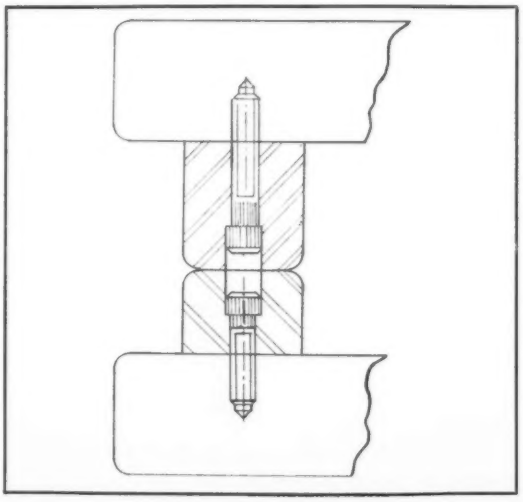


**Fig. 1. This type of stop block installation offers the most for your money. It is simple to make and easy to mount. It is easily held when initially grinding to overall length, and is readily removed (without taking the die out of the press) for subsequent grinding or when not wanted during the press run.**

old. We engage the clutch and revolve the flywheel until the ram is at its lowest point; this is the down stroke. We place a jack under the ram and begin to pump the jack. We observe the ram rising until all the play is out of the ball socket of the adjusting screw. As we continue to pump, we observe that now along with the ram the adjusting screw and connection are also rising. This rise continues until all of the play is out of the fit between the connection and the throw of the crank . . .

**Fig. 2. This type of stop block installation involves more work than the example in Figure 1 but offers the advantage of an accident prevention feature. With this construction the diemaker doesn't risk mashed fingers as he positions the punch holder on the shoe.**



Now, as we continue to pump the jack, we observe that not only are the ram, adjusting screw, and connection moving, but now the crankshaft with the flywheel is also rising. They continue to rise until the uppermost surfaces of the main bearings are contacted by the crankshaft.

Can you imagine this going on every time you make a hit on this press?

Can you imagine that every time you make a hit with a progressive die all the punches plunge through the material the distance of the accumulated play?

Can you imagine what happens to small diameter punches that are being punished by this excessive entrance?

Can you imagine the abuse small diameter punches receive from the stripper when they are "over-entered" through the material?

You might say, "But you're talking about a sixty year old press."

And I say, "You will find this condition is true on all your presses, but is more evident as the press is in use for some time. As for the press being sixty years old, check the vintage of your presses; you'll get the surprise of your life when you find out how old they are. Remember this: Wear is not influenced by **age** but by the number of **hits** the press has made. An automatic press, operating night and day at high speeds, is apt to make **more hits in a year** than a press used intermittently on a single shift for sixty years."

Are we still talking about stop blocks? We most certainly are. A balanced system of stop blocks, installed properly, will prevent this drop-through from occurring.

By balanced system installation, I don't mean one "itty-bitty" replica of a block. I mean four stop blocks should be installed. Four blocks with enough surface area to prevent any sinking from taking place, to prevent any rocking, and to prevent any deflection from occurring.

Perhaps you think because you are using a work press to hit bottom that the up and down play won't give you any trouble. You have another guess coming. Let me illustrate.

Let's say that you've set a sharp faced metal marking die in the worn press. It may have cost a hundred dollars. Every time a hit is made **with a piece in the die,** the letter stamping comes out clearly imprinted on the piece. It's beautiful, and it remains so long as the operator places a piece on the die before making a hit. Now let's say the operator makes a hit without a piece in the die. What's the result? One beat up stamp—out the window—

down the drain—in the scrap pile—wherever beat up stamps eventually end.

Don't find comfort by blaming the operator; blame yourself for not using stop blocks. A couple of bucks, well spent, would have saved a hundred.

You give your setup man a die to set in a press, and you tell him that the piece part produced is vitally affected by the ram adjustment. The die has no stop blocks. Who do you think he is, a miracle man? That he pulls rabbits out of a hat? No sir, brother, he's as human as you and I. Let's suppose he is lucky enough to set it exactly right. Do you know that the first time the press is greased or oiled the amount of drop-through changes? Perhaps enough to produce scrap stampings. You think not? Try it.

Give the setup man an even break; provide the die with stop blocks.

So far we have discussed the up and down play that occurs in presses and the role that stop blocks have in meeting the problem. Let us digress from this and relate the advantageous use of stop blocks to another common failing of mechanical presses. This common failing is in the maintenance of proper fit in the gibs or slides governing the ram travel.

We won't enter into the whys or wherefores of this condition, except to state that if you conducted an inspection of your press equipment and found that fifty percent of your presses were in proper working condition then you should be complimented. I doubt whether you would be that fortunate. Let's not kid ourselves. Let's admit that a sloppy fit is the general finding between ram and gibs; this in turn affects parallelism between bolster and ram face. Remember that press equipment is never maintained as precise or accurate as toolroom equipment.

Ever since the general acceptance of the die set in press tooling, the strict maintenance of proper fit between gibs and ram has diminished. Often it can be found that the ram is being guided by the posts and bushings of the die set. This is not the way it should be; the die set's contribution is that of an aid to the setup.

Are we still discussing stop blocks? You bet we are.

If you were to put a die in a press with this ram condition, what would happen? Let's try to observe the behavior of this floating ram during the cycle of its performance on a progressive die. We feed a strip of metal between the stock guides up to the first stop finger. Now we jog the control button to inch the ram down until the first station punch contacts the

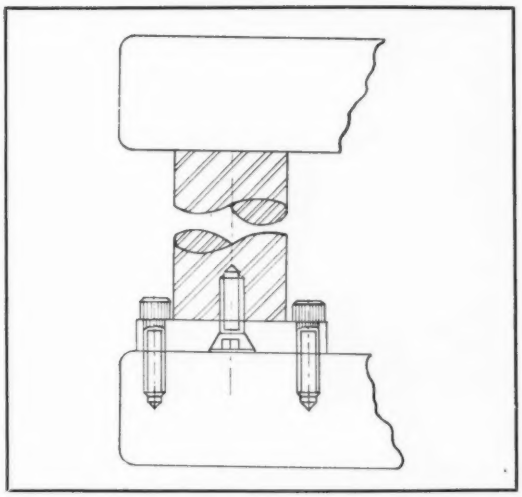
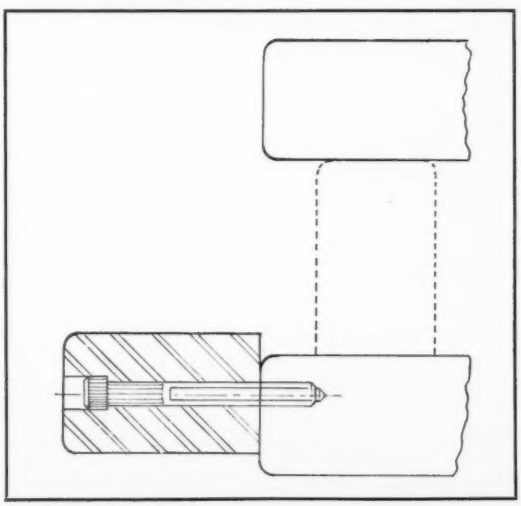


**Fig. 3. This type of stop block is desired on large dies that have a high shut height. The block is mounted on the lower plate and the plate, in turn, is secured to the shoe. This provides simplicity of removal.**

material. When this resistance is met, observe the opposite end of the punch holder and note how it tips down as the ram seeks the line of least resistance when the first station punch attempts to cut through the metal. As we progress the strip further through the die, you can observe less and less tipping of the ram taking place. However, as the last hit on the strip is made, you will notice that the tipping of the punch holder is taking place at the first station end of the die. If the side

**Fig. 4. Sometimes the stop blocks are removed after the setup and remain off the die during the production run. When, and if, this is done, the front edge of the die shoe should be provided with tapped holes by which the blocks are stored during non-use. Stop blocks have a way of mysteriously disappearing once they are removed unless some provision is made to fasten them to the die.**



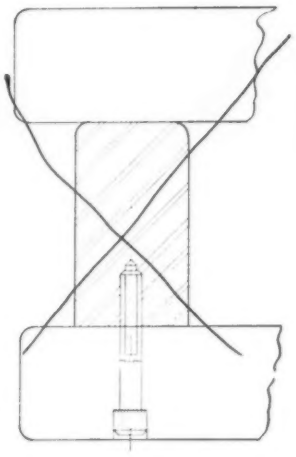


Fig. 5. This represents the wrong type of stop block installation. Removal of the stop blocks for grinding is necessary if a slightly lower setting is found necessary. With this arrangement the stop blocks could not be removed without taking the die out of the press.

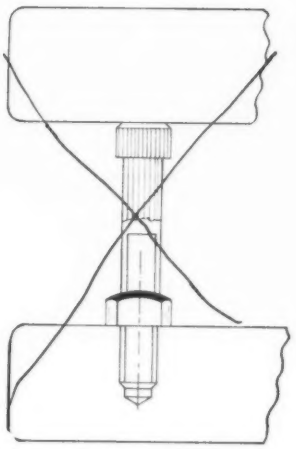


Fig. 6. A type of die stop method to be avoided. This presents a great temptation to the die setter to make his own adjustments. This can be prevented by using the solid type of stop block.

play in the ram slides is excessive, the tipping that occurs during the starting and ending of a strip can be so severe that clashing of the punches and die is inevitable.

Cut down on repair costs. How? Stop blocks are the answer to prevent "over-entering" during the tipping brought about by poor fit between ram and gibs.

Have you ever observed how large dies are maltreated while being moved or stored? Some lift truck operators treat a die as though it were "just another hunk of iron". Sometimes they dump the die end-over-end in order to grasp it in the proper position. During this shock treatment most anything can happen to the die. A diemaker usually handles a die as the amazingly delicate tool that it is. How can you prevent rough handling? I don't know. Do you?

Stop blocks are the answer to prevent damage to fragile punches if a die is dropped or dumped by a move man.

One of the best ways to get the longest life from any cutting die is to prevent the diesetter from "over-entering" the punches. When this over-entering is prevented, the sheared edges of punches and die due to misscuts and partial blanks are reduced to a minimum. Consequently, less metal need be removed to resharpen the punches and die. How do you do this?

Provide the die with stop blocks.

The most exacting operation that a diemaker performs is the final assembly of all the components in the die set. This delicate operation commands all of the diemaker's skill. During this assembly operation the diemaker checks the spacing between the punches and die openings for they must be equally spaced for perfect cutting clearance. In the performance of this operation the diemaker raises and lowers the punch holder as many times as he does his checking. If the die lifting bar he uses to open and close the die should slip, the die is apt to close completely. When it does this, the punches enter into the die until the radius of the punch smacks the cutting edges of the die. Result—all punches are ruined. For the sharp die strikes a ring into the supporting radius of the punch. Sooner or later the diemaker may install stop blocks. Why not install them prior to this assembly operation?

There are various ways to make or install stop blocks; the simplest and the best way is to make them from round bar stock and mount them on the die so that they can be removed for grinding while the die remains in the press.

Stop blocks help the diesetter, diemaker, and the move man. Stop blocks save cost on maintenance, grinding, and repairs. Stop blocks correct some press deficiencies. Use them. Use them often.

## *MARK, COAT STAINLESS*

***A new photochemical process developed by Ateen-ate, Inc. of Boston permanently coats and integrally marks the surface of stainless steel. It produces a hard, highly ductile, non-crystalline structure which is in many ways more resistant to chemical and physical damage than the unprocessed metal. Applications include instrument, weapon, name plate, dial, and schematics production.***

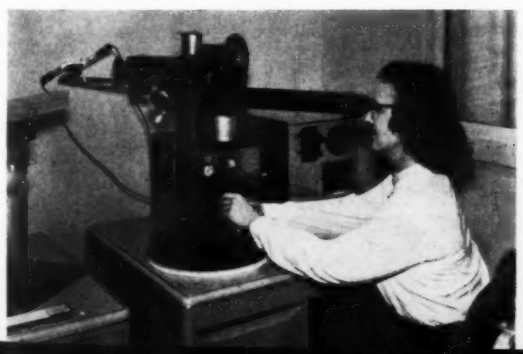
# Eli Whitney Laboratory:
# New Source for Dimensional Certification

THE ELI WHITNEY METROLOGY LABORATORY, newly established at Dayton, Ohio, by the Sheffield Corporation, is named in honor of the pioneer American industrialist who in 1799 laid the foundation for American mass production and industrial development by proving his then revolutionary concept that manufacture of interchangeable parts was possible under a system of adequate dimensional control.

This concept has expanded until the relationship of progress and precision brings an ever mounting need for better, more reliable standards and techniques of measurement to cope with the progressive shrinkage in product tolerances.

The new Eli Whitney Metrology Laboratory has been established to meet this growing need and to further extend the facilities and great precision resources on which Sheffield Precision has always been based.

The industry-wide purpose of this project is two-fold. First, it supplements on an industrial basis the work of the Metrology Division of our National Bureau of Standards in supplying industry with certified precision standards for dimensional control in the production shop, tool shop, and in the gage laboratory. It is a service of dimensional testing and certification which until now has been available to industry only at the Bureau of Standards. Second, it is a counseling service for executives and technicians responsible for dimensional control throughout industry. Here the procedures and instruments necessary to high level precision standards calibration may be observed and discussed.



Years of research and study of all the leading government standards laboratories of Europe and America went into the design of this laboratory so that it is a composite of the best features of the laboratories of England, France, Germany, and the National Bureau of Standards at Washington.

The laboratory is equipped to provide modern industry with precise standard measurement, certified to an accuracy of .000001".

Measurement and inspection services available to private industry and government include: calibration of gage blocks; plain taper and ring gages; master setting gages; surface plates and parts flatness; thread gages; thread and gear measuring wires; precision circles; fiber fineness measuring; measurement of parts contour; cylindrically ground parts; and analysis of surface finish.

The instruments used in the laboratory include apparatus of American, German, English and Swiss origin. The master instrument for light wave comparison measurement, shown at left, is the Zeiss Koester Absolute Interferometer, invented by the late Dr. Albert A. Michelson, distinguished American physicist and Nobel Prize winner. It uses light sources of either helium, krypton, cadmium or the mercury 198 isotope.

# *Technical Conferences*

•Techniques
•Technology
•Trends **FOR**

**Monday, March 19**

**What About Ceramic Cutting Tools?**
"Ceramic Tooling Brought Up to Date," by W. B. Kennedy, Chief, Experimental Machining Branch, Rodman Laboratory, Watertown Arsenal.
"Cemented Borides for Tool Materials," by A. G. Metcalfe, Senior Metallurgist, Armour Research Foundation.
**Working the "Wonder" Materials**
"The Drawing of Titanium," by J. S. Kirkpatrick, Vice President, Brooks & Perkins, Inc.
"Machining With Silent Sound," by Jack Welch, Mgr., Machine Tool Div'n, The Sheffield Corp.
**What's New in Grinding?**
"Recent Advances in Grinding Wheels," by Carl Sonderlund, Sales Engineer, Norton Co.
"Precision Production Grinding Machines," by A. H. Dall, Director of Standard Machine Tool Engineering, The Cincinnati Milling Machine Co.
"Electrical Discharge Grinding of Tools," by V. E. Matulaitis, Director of Research, Elox Corp. of Michigan.
**Diamond Tool Symposium**
"Man-Made Diamonds," by J. S. Gillespie, Mgr., Diamond Project, Carboloy Dep't of General Electric Co. (Dinner meeting)

**Tuesday, March 20**

**Diamond Tool Symposium**
"Crystallography and Grinding Hardness of the Diamond Crystal," by Dr. J. F. H. Custers, Director of Research, Diamond Research Laboratory.
"The Selection, Division and Shaping of Diamond for the Manufacture of Diamond Tipped Tools," by R. G. Weavind, Director of Research, Diamond Research Laboratory.
"Some Aspects of the Batch Production of Diamond Tools," by N. R. Smith, Director, L. M. Van Moppes & Sons, Ltd.
"Diamond Dressing of Form Grinding Wheels," by Jack Bryant, Process Engineer, Allis-Chalmers Mfg. Co.
"Shaped Tools for Form Grinding From the Manufacturers' View Point," by J. B. Speirs, Chief Engineer, American Coldset Corp.
"Suggested Standards for Diamond Tool Shanks," by Martin Hoerer, Vice President, Golconda Corp.
**Automating the Individual Machine**
"The Tool Engineer's Function in Numerical Control," by J. Daugherty, Vice President-Engineering, Giddings & Lewis Machine Tool Co.
"The Use of Punched Cards for Machine Control," by J. J. Jaeger, Vice President, Chief Engineer, Machinery Div'n, Pratt & Whitney Co., Inc.
**Machine Tool Economics—Rent or Buy?**
"The Case for Buying Machine Tools," by George Terborgh, Research Director, Machinery & Allied Products Institute.
"Economics of Replacing Machine Tools by Equipment Rental," by F. J. Trecker, President, Kearney & Trecker Corp.
**Plastic Tooling Challenges the Tool Engineer**
"Advantages of Plastic Tooling," by Fred Lyijynen, Supervisor, Plastics Development Dep't, Auto Body Div'n, Chrysler Corp.
Interview Panel: John Mickey, Manager, Research Dep't, Ford Motor Co.; Robert H. Voss, President, Warren Plastics & Engineering Inc.; E. R. Kalis, General Foreman, Fisher Body Div'n, GMC.
**Professional Engineering—How and Why?**
"Why Register," by Paul H. Robbins, P.E., Executive Director, National Society of Professional Engineers.
"How to Become a Registered Professional Engineer," by John D. Constance, P.E.
**Tool Engineering Research In Action**
"Methods of Applying Cutting Fluids," by Prof. M. C. Shaw and Prof. P. A. Smith, Machine Tool Lab, Massachusetts Institute of Technology.
"Metal-Cutting Evaluation," by F. J. Daash, Chief Machinability Engineer, Rock Island Arsenal Laboratory.
**Solving Carbide Die Problems**
"Machining Carbide Dies by the Electrical Discharge Method," by J. K. Carroll, Executive Vice President, Electrosize, Inc.
"How to Help the Die Builder Give You Satisfaction," by H. H. Harig, President, Harig Mfg. Corp.
"What the Strip Steel Manufacturer Should Know," by Burton E. Longwell, Ass't Manager of Sales, Republic Steel Corp., Sheet & Strip Div'n.
"The Die Builder Asks for Help," by Don E. Oberg, President and General Manager, Oberg Mfg. Co., Inc.
"Application of Cemented Tungsten Carbide for Dies," by P. F. Rehner, Manager of Sales, Carmet Div'n, Allegheny Ludlum Steel Corp.
"The Stamper and Die Building," by Thomas C. Roberts, President, Kozby Tool Co.

**Wednesday, March 21**

**Diamond Tool Symposium**
"Use of Industrial Diamond and Diamond Tools in Industry," by D. J. Wallace, Vice President, Wheel Trueing Tool Co.
"The Use of Diamond Tools for Turning and Shaping of Small Parts," by L. A. Hurwitz and R. A. Kurtz, Hamilton Watch Co.
"Application of Diamond Tools to Turning, Boring, and Reaming," by Joseph Klipper, Vice President and General Manager, Clipper Diamond Tool Co.
**Production of Fine Pitch Gears**
"An Objective Look at the Field of Instrument Gearing," by Louis D. Martin, Gear Consultant, Eastman Kodak Co.
"Gears Gaging Automation," by T. S. Gates, Chief Engineer, National Broach & Machine Co.
**Electronic Calculators and the Tool Engineer**
"Introducing Computers for Machine Tool Control," by J. J. Stone, Ass't Chief, Electrical Engineering Div'n, Battelle Memorial Institute.
"The Machinability Computer," by Dr. W. W. Gilbert, Consultant Machinability Development Service, General Electric Co. and E. J. Weller, Carboloy Dep't of GE.
**Diamond Tool Symposium**
"Cemented Particle Diamond Tools," by C. Law McCabe, Metals Research Lab, Carnegie Institute of Technology.
"The Selection of Diamonds for Various Applications," by Dr. G. P. Freeman, D. Drukker and Zn. N.V.
"Cutting of Glass, Ferrites, Carbide and Ceramics," by Leon Van Geersdaele, Diamant Bort.
**Automation, Tolerances, Jigs and Fixtures**
"Impact of High Accuracy (Low Tolerance) Requirements on Jigs and Fixtures in Mass Production," by A. V. Bodine, President, the Bodine Corp.
"Automation—Its Effect on Jigs and Fixtures," by H. M. Adams, Automation Specialist, Chrysler Corp.
**The What and How of Surface Finish**
"A Survey of Surface Finish Inspection Techniques," by C. H. Good, Production Engineer, Micrometrical Mfg. Co.

FOUR IMPORTANT TECHNICAL FEATURES, each planned to relate significant information on modern techniques, technology, and trends in tool engineering, are scheduled for the American Society of Tool Engineers' Tool Show week in Chicago this month.

The Tool Show Exposition and Industrial Conferences will draw approximately 40,000 manufacturing executives, supervisors, and engineers from companies representing 90% of the nation's total production capacity, to Chicago's International Amphitheatre, estimates Harry E. Conrad, ASTE executive secretary. A special Diamond Tool Symposium, and 14 plant tours round out the week's planned activities.

At the Tool Show itself, by far the largest ever planned by the ASTE, manufacturers will display the most modern tooling devices along with long-popular and long-proven tooling equipment. Numerous "first showings" of machines and tools will dot the exhibition halls.

Sixty top executives and engineers are scheduled to discuss the latest equipment and research developments, and engineering subjects of particular value to tool engineers, at the convention's technical sessions.

Each day's program will feature some particular aspect of tooling. The use of ceramic tools and electronic processes for removing

# BETTER TOOLING IN 1956

metal are among the subjects to be covered in papers on Monday, New Materials Day. Machine tool automation, plastic tooling, carbide die problems, and general tool engineering research lead the topics on Tuesday, Research Day. Economical production of fine pitch gears and automation are among the topics for Wednesday, New Processes Day. Thursday is to be Management Day, with emphasis on training and product and tool maintenance analysis. On Friday, Tool Engineering Day, subjects will include designing for tomorrow's competition, and standards and the tool engineer.

### Diamond Symposium

What may be the opening salvo in the coming battle of natural vs. synthetic diamonds, according to conference executives, will be sounded at the Convention's Diamond Tool Symposium, co-sponsored with the ASTE by the Armour Research Foundation.

J. S. Gillespie, who is in charge of the man-made diamond project at Carboloy, will open the 13-paper symposium on the evening of March 19 with a discussion of the current status of man-made diamonds, their properties, and future uses.

Sharing the spotlight that evening at the Armour Research Foundation will be a $4-million display of man-made, gem, and industrial diamonds.

During the two days of the Symposium, diamond experts from South Africa, The Netherlands, Belgium, England, and the United States will discuss the uses of diamonds as industrial tools, diamond structure, suggested standards, selection, and specific applications.

The million dollar industrial diamond display at the Tool Show is to include an actual diamond workshop where several diamond cutters will be producing tools on special machinery shipped to the Show from South Africa and Europe.

### Industrial Tours

Conference and Exposition registrants will have an opportunity to observe manufacturing operations in twelve Chicago area plants during the Show week of March 19-23. Fourteen inspection visits to Motorola, Inc.; United States Steel's South Works; the Armour Research Foundation; Skil Corporation; Ford Motor's Aircraft Engine Division; Scully Jones & Company; Hotpoint Company; Kropp Forge Company; International Harvester's Melrose Park Works; the Electromotive Division of General Motors; Sears Roebuck & Company's Merchandising, Testing and Development Labs; and Verson Allsteel Press Corporation, have been planned by the convention committee to show some of the most modern production processes in action.

"Surface Finish and the Production Engineer," by Dr. C. R. Lewis and A. L. Thomson, Chrysler Corp.

**Automation—You Can Afford It!**

"Automation for the Big Production Shop," by Ralph E. Cross, Executive Vice President, The Cross Co.

"Automated Electronics," by J. B. Cunningham, Manufacturing Specialist, Convair Div'n, General Dynamics Corp.

**Thursday, March 22**

**Fluid Power Today**

Titles to be announced.

**Applied Metal Cutting Research**

"Crater Wear of Cutting Tools," by Prof. K. J. Trigger and Prof. B. T. Chao, Dep't of Mechanical Engineering, University of Illinois.

"Some Applications of Research Findings to Shop Problems," by Prof. L. V. Colwell, Dep't of Production Engineering, University of Michigan.

**Developing Tool Engineers**

"The Training and Development of Tool Engineers," by Prof. O. W. Boston, Dep't of Production Engineering, University of Michigan.

"Industry Looks at the Engineering Shortage," by T. C. Gleason, Ass't Chief Engineer, Chrysler Corp. Laboratories.

**Cost Reduction Through Product & Tool Maintenance Analysis**

"Product Changes Improve Manufacturability," by L. D. Miles, General Electric Co.

"Control of Tool Costs Lowers Production Costs," by E. Griffiths, Director of Expense Control Headquarters Mfg. Div'n, Westinghuse Electric Corp.

**Friday, March 23**

**Designing for Tomorrow's Competition**

"Measuring Productivity in Tool Design," by Prof. A. F. Gould, Dep't of Industrial Engineering, Lehigh University.

"Planning for Tomorrow's Gaging," by Lewis O. Heinold, Manager, Automatic Control Engineering Dep't, Federal Products Corp.

**Standards and the Tool Engineer**

"ASTE-Recommended Carbide Tool Tip Standards," by W. H. Seacord, Supervisor of Mfg. Standards Research, International Harvester Co.

"The Need for Tool Steel Standards," by Dr. G. A. Roberts, Vice President-Technology, Vanadium Alloys Steel Co.

**Tooling the World's Largest Presses**

"Tooling Problems for Utilization of Large Hydraulic Presses," by A. E. Favre, Chief Production Engineer, Cleveland Forge Plant, Aluminum Co. of America.

"Tool Problems Peculiar to the Heavy Press Extrusion Industry," by H. J. Ross, Production Manager, Heavy Press Extrusion Plant, Kaiser Aluminum & Chemical Corp.

**Lubrication for the Tool Engineer**

"Soluble Oils and the Tool Engineer," by Dr. R. K. Gould and R. C. Givens, Technical Service Div'n, Research & Technical Dep't, The Texas Co.

"Role of Cutting Fluids in Machinery Operations," by Dr. M. E. Merchant, Ass't Director of Research, Cincinnati Milling Machine Co.

# A Potpourri of Products from

DIVERSIFICATION OF INDUSTRY has long been Chicago's almost magic formula for achieving giant-size lists of "firsts" "seconds" and "leadings" in world trade. This diversification has also made Chicago the "most depression resistant area in the world," says Thomas H. Coulter, chief executive of the Chicago Association of Commerce & Industry.

It is hard to name a product Chicago doesn't have a hand in making—from machine tools to home appliances, from food products to cosmetics.

World leader in steel production and fabrication of metal products, non-electrical machinery, railroad equipment, and electronic machinery, to name a few, the area's future, judging from current production records and expansion plans, will continue to earn more first-place laurels for some time to come.

Output of manufacturing plants in the area in 1955 amounted to $19.1-billion, surpassing the previous record year of 1953 by almost a billion dollars. Investments in manufacturing plants during the year totalled almost $555-million, reports the CACI, topping even the defense-minded years of 1942 and 1951.

Since 1939, nearly 5,000 manufacturing plants have joined the Chicago Industrial Area, bringing with them 460,000 jobs. Within the next 15 years, Coulter predicts, new plants should provide jobs for 300,000 directly, and another 450,000 indirectly.

In Cook County alone there are 650 plants; twice as many as in its nearest rival, Los Angeles. In the near future at least six more very large organizations will move into the area and many more already located within the area will expand. Procter & Gamble, Goodrich Tire & Rubber Co., and the New Ekco-Alcoa Container, Inc. will soon bow into the Chicago area, along with Avon Products, Inc. (cosmetics), and Wabash Fibre Box Co.

### Mills Grow Too

The primary metal industries in the area last year recorded a total production valued at over $3-billion, 34% higher than the previous year. Steel production alone amounted to an estimated 21½-million net tons. Large increases in the capacity of area steel mills will allow this record to be broken in future years if production continues to remain at present rates.

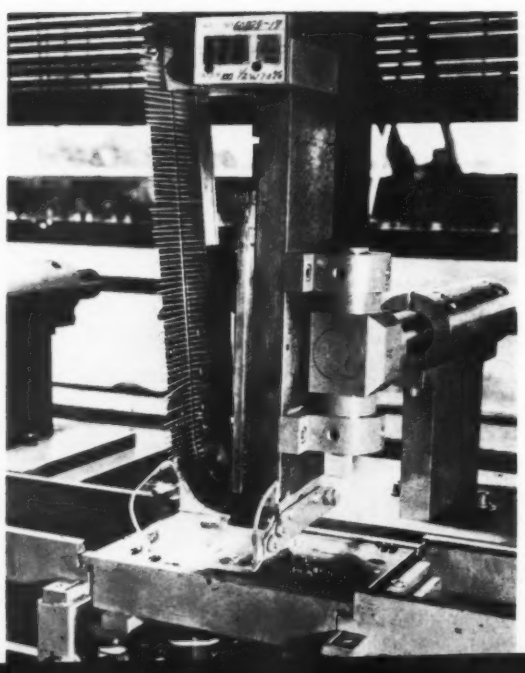
Inland Steel's East Chicago plant expansions will increase production by 15% there. United States Steel Corp., largest industrial employer in the Chicago area, plans to increase its Gary Sheet & Tin Mill and Republic Steel's plans call for increasing its South Chicago Mill by 25%.

Columbia Tool Steel Co., Acme Steel Co., Bliss & Laughlin, Inc., and others process Chicago-made steel into tool steels and other specialties that are used throughout the world.

### Home of Electronics

The electronics industry had its start in Chicago in 1900 with the invention of DeForest's electronic tube. The area now leads the nation in producing more than $1½-billion worth of electronic and electrical goods annually. Chicago's electrical goods output runs into thousands of products, ranging in size from great industrial trucks to minute hearing aids. Some 80 companies in the area are members of the Radio-Electronics-Television Manufacturers Association, industry trade group.

Admiral Corp. is Chicago's largest electronics manufacturer. At Admiral, as at Zenith, Motorola, Western Electric, Webster-Chicago, Bell & Howell, Raytheon, or at any of the other electronics and electric equipment plants, considerable retooling is undertaken every time new models are introduced, covering delicate components as well as trim. Nearly half a million dollars worth of tooling, for instance, went into the production of the new offset duplicator designed by Ditto, Inc.

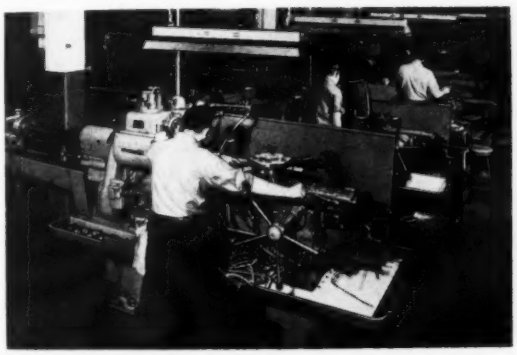


**A special automatic production machine inserts resistors on a printed circuit at Admiral Corp., Chicago's largest electronics manufacturer. The unit trims wire leads and inserts them through holes in the board.**

# INDUSTRIAL CHICAGO

United States Steel Photo

With some 100 appliance manufacturers in the area, Chicago also leads the nation as maker of home appliances. There, Hotpoint operates the world's largest electric range plant. Thor Corp., a leader in the home laundry equipment field, is also located in Chicago, as are Sunbeam Electric, General Electric, Norge Division of Borg-Warner, International Harvester, and others.



**The "arms and hands" for machine tools — precision holding devices — are produced in Chicago by firms like Scully-Jones & Co. Here, a view of the firm's turret lathe department.**

### Transportation Equipment

The size and variety of Chicago-built transportation equipment is little short of astounding. Last year such products brought in well over a million dollars in the area. The CAIC estimates that probably 90% or more of that total consisted of railroad items, ranging from huge diesel electric locomotives down to tiny thermostats.

The Electromotive Division of General Motors leads the field with production of diesel locomotives, while Pullman-Standard Car Co., General American Transportation Co., American Steel Foundries, and others are also responsible for the railroad equipment record. Ford Motor Co., International Harvester Co., and Borg-Warner Corp. are some of the Chicago plants involved in the production of other types of transportation equipment.

Ford's new stamping plant is the fourth Ford unit to be located in the Chicago area and will be the third large automotive stamping plant in this area when completed.

Chicago has its share of the "unsung heroes" of manufacturing, the job shops that make millions of parts yearly for manufacturers all over the world. Precision made screw machine products, gears, springs, stampings, forgings, castings, valves, and bearings are among the items manufactured by about 4,500 specialty houses in the area. The long list of major producers includes some of the biggest names in the parts industry: Foote Bros., Gear Specialists; Crane Co.; Kropp Forge; Laystrom Manufacturing; and U. S. Industries.

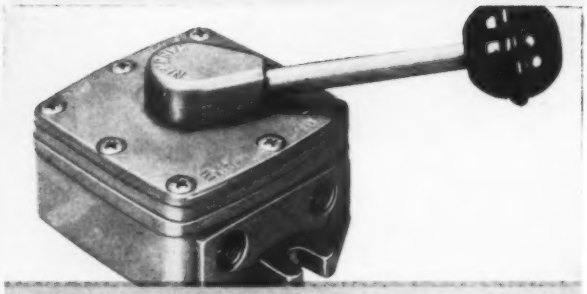
The heavy metalworking machinery industry in Chicago is represented by three of the largest pressmakers in the business — Danly Machine Specialties, Verson Allsteel Press Co., and Clearing Machine Corp. Clearing recently added 61,000 sq. ft. to its facilities.

The list of machine tool and general machinery builders in Chicago is almost endless, as are their products — from farm machinery to printing presses, to . . . .

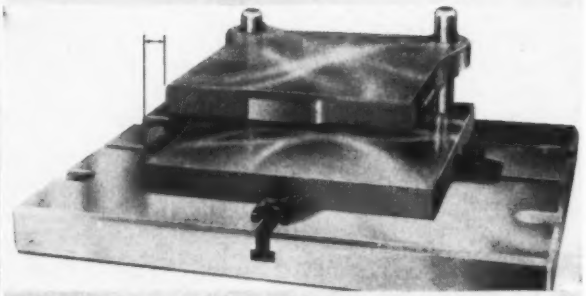
Behind all the mass production in Chicago's manufacturing plants, is the area's tool and die industry. The tools, dies, jigs, fixtures, and special gages produced by the 5,000 workers in Chicago's 500 contract tool and die shops amount to about $75-million worth annually. Extremely diversified, they are capable of making everything from the smallest, most intricate dies to large automobile dies.

Diversification, expansion, and model changes for both consumer goods as well as industrial goods produced in and around Chicago create, each year, greater and greater tooling requirements. Further industrialization, mechanization, modernization, and automation will make the tool engineers even more important for designing means of turning out high quality goods more economically in Chicago and outside the area's limits.

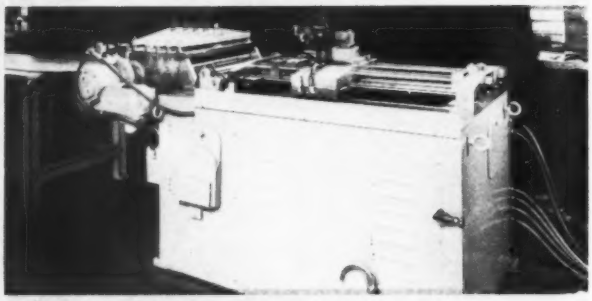
# TOOL SHOW



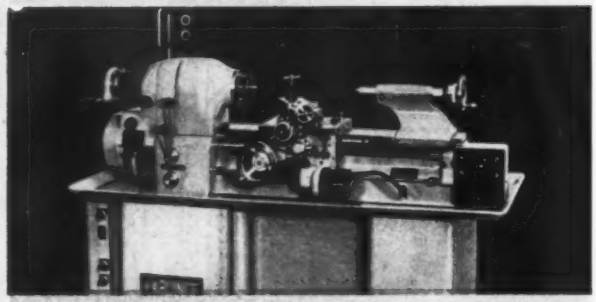
● Hannifin's "Blue Ribbon" entry in the Tool Show will be the "Lap Seal" valve, a smaller, lower cost, 4-way, disc-type air control unit. All four ports are in the same plane, with the inlet and exhaust ports on one side and the two cylinder ports on the other side. This allows every internal part of the valve to be reached by removing the cover and without disconnecting any piping. The disc-to-plate seal is airtight at all pressures, and either of two operating sequences can be provided. Many other improved hydraulic and pneumatic products will also be shown at Booth 158 by Hannifin Corp. of Des Plaines, Ill. (S1)



● Eight major advantages are available to diemakers with the new "Leadership Line" of die sets which will be shown at Booth 596 by Danly Machine Specialties, Inc. of Chicago. They include precision lapped chrome-plated guide posts to provide high resistance to wear; availability of demountable bushings; new long and short precision shoulder bushings; simple clamping method for die sets which have a right to left die area dimension of 20" or more; and one guide post ½" longer than the other so removal of punch holder during die making is easier. (S2)



● A whole group of new coil feeding and straightening machines are to be demonstrated by U.S. Tool Co. of Ampere, N. J., at Booth 375. Model SFC-24-24 is a motor-driven cabinet-mounted slide feed with 8-roll plain straightener and with a pair of motor-driven take-in rolls. Since it is an individual unit, there are no mechanical connections to the press it is feeding. It can be used throughout the shop for feeding in any direction. It handles stock up to 24" wide and has a maximum feed length that is adjustable up to 24" at one stroke. (S3)

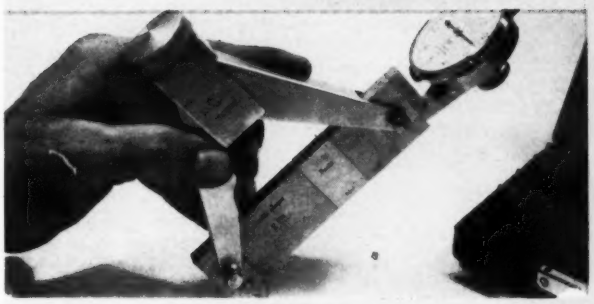


● The operating ease, accuracy, and cost cutting ability of Hardinge lathes, millers, and chucking and second operation machines will be demonstrated in Booth 452 by Hardinge Bros., Inc. of Elmira, N. Y. On exhibit for the first time will be the push button spindle speed controls on all precision lathes, such as the HLV lathe pictured. Also shown will be the new improved models of HC and HCT precision chucking machines. A special section will be devoted to collets and feed fingers for all types of automatic screw machines, turret lathes, and chucking machines. (S4)

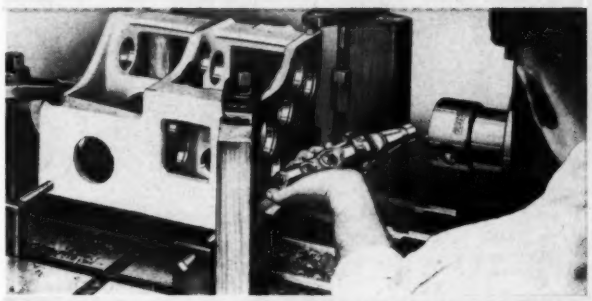
**For Details, Circle Key No. on Inform-A-Gram Card**

# PREVIEWS

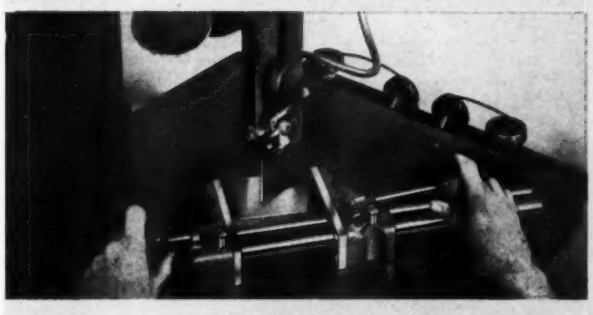
- Two important gaging services are among the items to be announced at DoAll's Booth 1520: Offer of a calibration report and also offer of assistance to plants in establishing "in-plant Bureaus of Standards." The unique "Micro-Step Gaging System" that uses rectangular gage blocks in assembling working gages of every type, size and description is also to be demonstrated by DoAll Co. of Des Plaines, Ill. (see photo). Unusual machining techniques on power saws, contour-matic band machines, surface grinders, and slicing machines will also be featured. (S5)



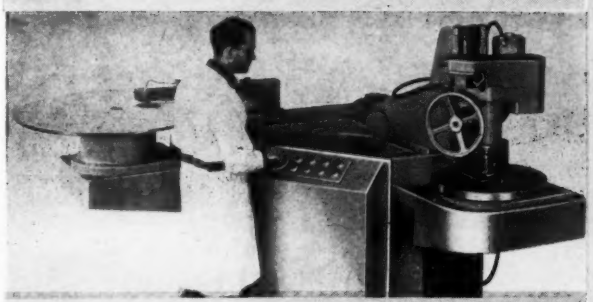
- The new Microbore Flash-Change Tooling System for quickly changing tools in all types of boring and milling machines without damage to the machine spindle, will be introduced at Booth 421 by DeVlieg Microbore Co. of Royal Oak, Mich. The holders provide maximum rigidity for all types of drilling, boring, and milling and tools can be changed in a matter of seconds. Flash-Change boring bars and adapters are located radially in the toolholders by means of driving keys, thus insuring positive repositioning of tools. (S6)



- "Circle-Grip," the unique built-in locking mechanism of "Grip-Master" vises and fixture locks has been incorporated into two new workholders to be shown by Heinrich Tools, Inc. of Racine, Wis., at Booth 788. One, the Heinrich 12WH band saw vise, can be set instantly by sliding the movable jaw into position. A soft, cold-rolled guide bar prevents damage to saw blades by contact with the hardened bar and removable shoulder screws are provided for automatic chain feed operation. The company's Grip-Master fixture base, and safety drill press vise are among the items to be shown at Booth 788. (S7)



- By following an enlarged conductive line drawing, Model 104 electronic template and cam machine produces external and internal contours on cams, templates, blanking punches, and dies. Its wide spindle speed range, from 48 to 11,500-rpm, permits milling in tough materials with large cutters, fast carbide milling, and also grinding operations. This machine as well as the Model 102 electronic Airfoil milling and the Model 105 Airfoil measuring machine will be exhibited in Booth 461 by New England Machine and Tool Co. of Berlin, Conn. (S8)



**For Details, Circle Key No. on Inform-A-Gram Card**

# TOOL SHOW PREVIEWS

● The P-21 portable groove gage is a new Bryant gage that is available as a complete kit with segments covering O rings and snap ring grooves through 5". This gage and Series 800 hi-frequency wheelheads and magnetic drums

for computers will be demonstrated at Booth 901 by Bryant Chucking Grinder Co., Springfield, Vt. The company will also show B-21 bench gages, P-21 portable thread gages, and "true" granite surface plates and stands. (S9)

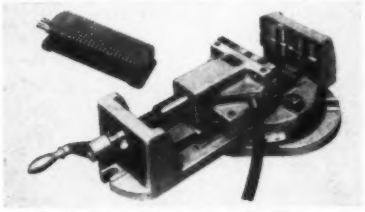
● Clausing heavy-duty precision lathes, drill presses, and vertical milling machines will be demonstrated in Booth 1418 by Clausing Division of Atlas Press Co., Kalamazoo, Mich. Highlighting the display will be the new Clausing 18" multiple spindle drill press that has bigger, heavier tables with 84" x 22" working surface, and greater distance between spindles. Other Clausing machine tools to be shown are the 6300 series 12" lathe, the 5300 series 12" lathe, and the Clausing vertical mill. (S10)

● A working model of the Octopus Grip vacuum chuck designed by Convair will be on display in Booth 1235. Fabricated from a tooling material called Pioneer 921-T, this chuck is used for milling complex shapes. Pioneer

Tool Engineering, Inc., El Segundo, Calif. will also have on hand other applications of this lightweight cast aluminum material, Pioneer 921-T. (S11)

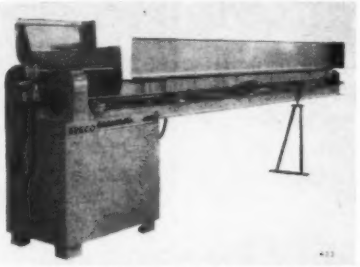
● The Zagar head for drilling printed circuit boards will be on display in Booth 179. Also to be shown by Zagar Tool, Inc. of Cleveland will be the recently introduced cam drill units, an air-oil feed drill press for multiple hole drilling in one operation. (S12)

● MilOmatic air powered hydraulic vises, manufactured by the Wilton Tool Mfg. Co., Inc., Schiller Park, Ill., combine instant action with 9000-lbs locking force and open up new possibilities in versatile automatic tooling. Nothing extends above the jaws so



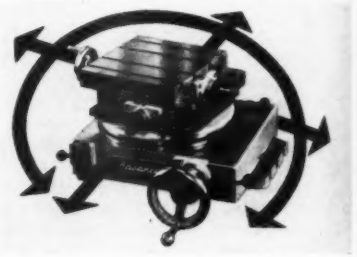
that it can pass all the way through cutters without damage. By replacing steel jaw inserts with the user's own jigs or specially shaped jaws, the MilOmatic can be used as an automatic machining fixture. These vises will be displayed at Booth 1208. (S13)

● Brehm tube cutters and trimming dies will be shown by the Brehm Division of The Steel Products Engineering Co. of Springfield, Ohio, at Booth 660. The tube cutter (illustrated) was developed as a better method of automatically cutting tubing, leaving no burrs



and wasting no stock. By merely changing cutting adapters, one machine will cut tubing in diameters from ⅜" to 2¼". The trimming die uses the patented "Shimmy" principle to trim drawn pieces in one press stroke. (S14)

● This Advance cross slide rotary table, designed for fast, accurate positioning of work from one location to another, will be featured at Booth 332 by Morrison Engineering Co., Chicago. The unit is made for use on all ver-



tical type milling machines and is designed to withstand maximum cuts which would ordinarily vibrate the heads of these machines. It is accurate to ±1 min on the rotary table and .0005" on the cross slide. (S15)

● The new Wales Positive Duplicator is an ingenious pantograph-like mechanical device for quickly and easily locating holes in simple or complicated patterns, and for accurately actuating the punching mechanism from a templet by remote control. It consists of a one-piece steel work

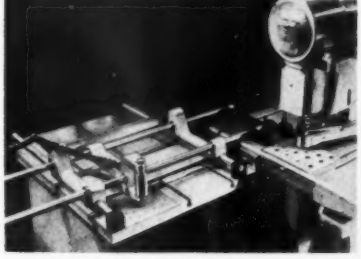


table with machined surface and T-slots for clamping templets in position. Wales-Strippit Corp., N. Tonawanda, N. Y., will also display their new tube piercing unit, as well as their sheet metal fabricator, and self-contained punching and notching units at Booth 379. (S16)

● The Worcester drill grinder will be displayed for the first time by Edward Blake Co., West Newton, Mass. This drill grinder will accurately sharpen 2, 3, or 4-lip drills, flat twisted drills, and flat or chucking drills. Also to be found in Booth 261 are Black Diamond drill grinders, a tap chamfer grinder, and a flute grinder. (S17)

**Want Information?** **For additional data on any of these products, Circle Key No. (in parentheses) on Inform-A-Gram Card, page 142.1**

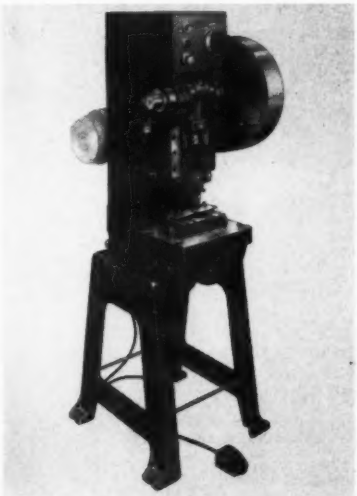
# TOOL SHOW PREVIEWS

● Visitors at Ingersoll-Rand's Booth 345 will be able to "test drive" the new torsion bar Torque Control Impactools. The tools' multiple torque settings are easily

changed with the aid of an adjusting collar and torque jig and they shut off automatically when the preset torque is reached. (S18)

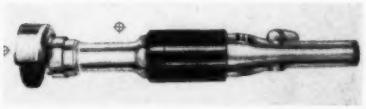
● A coolant known as Trim has been developed which improves the efficiency of machine tools and reduces maintenance costs by preventing rust, sticking, or gumming of machine moving parts. In addition to Trim, Trim Mist, Trim Clear, and Trim Ti-Grind will be exhibited in Booth 1133 by Master Chemical Corp., Toledo, Ohio. (S19)

● Kenco's new 15-ton Electro-Safe press, to be shown in Booth 618, is designed to fill the growing need for fool-proof press safety features as well as to offer extended high production versatili-



ty and low cost maintenance. Five significant safety advances ensure safe press control, according to the manufacturer, Kenco Mfg. Co., Los Angeles. (S20)

● This entirely new, highly sensitive governor is the outstanding feature in the redesigned Buckeye X-4 portable, air-operated abrasive tool line. They develop greater horsepower and maintain higher speeds under load, a combination that results in faster metal removal and finishing work.

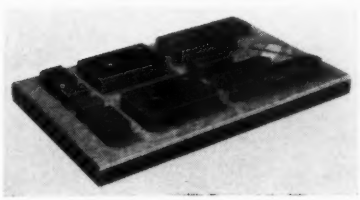


The C Series horizontal grinder shown here is just one of a complete line of horizontal grinders and buffers, vertical grinders and sanders, and right angle sanders now carrying the X-4 model designation. The new tools will be premiered by Buckeye Tools Corp., Dayton, Ohio, at Booth 113. (S21)

● Two new machines for tool grinding which are not only new in construction, but are new in principle—an Electrolytic chip breaker grinder and an Electrolytic carbide tool grinder — will be premiered by Hammond Machinery Builders, Inc. of Kalamazoo, Mich., at Booth 675. Another entirely new machine, the Hammond Mist Kolector, will also be shown along with Hammond's line of Dust Collectors and tool grinders. (S22)

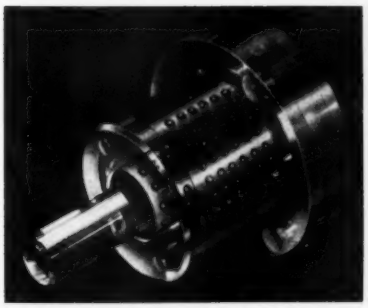
● Heading the list of Bokum tools to be displayed at Booth 136 will be two of the newest tools in the line: O-ring and retaining ring grooving tools. New swing tool holders and a new adjustable tool holder for turret lathes as well as boring and turning tools will also be featured by Bokum Tool Co., Inc., Detroit. (S23)

● The new step block and clamp sets being added to Northwestern Tool & Engineering Co.'s line of



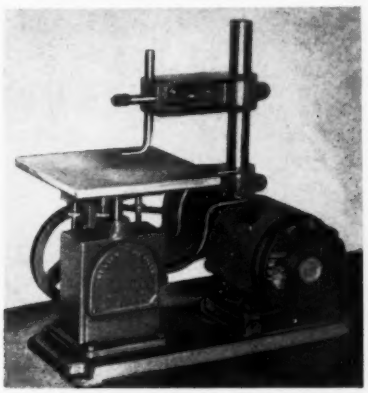
tools will be featured at Booth 301. They are available for holddown bolts from ⅜" through 1" dia. Northwestern Tool & Engineering is located in Dayton, Ohio. (S24)

● Incorporating a unique patented principle in their construction, the line of Size-Positive boring quills is being shown nationally for the first time at Booth 159 by Briney Manufacturing Co. of Pontiac, Mich. The Briney principle consists of a bushing mounted on preloaded ball bearings between the flange and boring bar. The hole in this bushing is eccentric with its outside diame-



ter. The boring bar is driven by the flange which is locked to the bar by an integral pin and lock nut unit. Inertia and spring tension on the bushing prevent slippage when starting or stopping the quill. Adjusting control is provided by graduating the outer surface of the bushing in increments of 1/10,0000" or larger. Plastic models will show their operation. (S25)

● A new Keller die filer for machine shops, tool and die departments, and repair and maintenance shops will be exhibited by



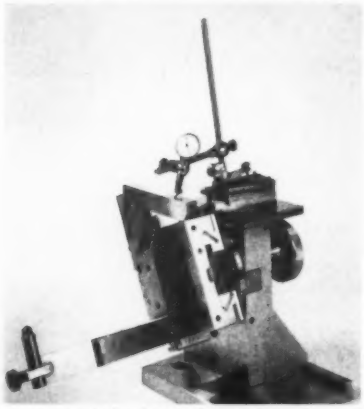
Sales Service Machine Tool Co., St. Paul, Minn. It will hold ⅛" dia up to ½" x ⅝" files. The filer will be found in Booth 393. (S26)

**Not Attending?** For additional data on any of these products, Circle Key No. (in parentheses) on Inform-A-Gram Card, page 142.1

# TOOL SHOW PREVIEWS

- A wide variety of special ball and roller bearings produced by Industrial Tectonics, Inc., Ann Arbor, Mich., will be displayed at Booth 1100. In addition, there will be a working display of the ballizing process for high-speed high-precision hole sizing and finishing, together with stainless steel tooling balls and sets of master balls. Precision balls of special alloys, plastics, etc. and balls modified by secondary machining operations will also be shown. (S27)

- Accurate wheel dressing of any combination of radii and angles is possible with the Zenith form dresser. There is no need for adding or subtracting from pre-



arranged sizes since the size of radii corresponds with the gage blocks used. Models 1A and 1B will be found in Booth 1033 operated by Monray Corp. of Dearborn, Mich. (S28)

- A new Press-Rite No. 2 power press will be on display and in operation at Booth 393. It is an economically priced 20-ton high speed, open back, inclinable with operating speeds of up to 300 strokes per min. Features include the 1½" stroke, solid bronze gibs, automatic lubrication system, special flywheel, air counterbalance, Airflex air friction clutch and brake, and new rotor seal timer limit switch. Other products to be shown by Sales Service Machine Tool Co., St. Paul, Minn., include the Press-Rite No. 3, No. 0, and No. 00 presses; Keller power hack saw and Keller die filer. (S29)

- Several new Pope precision spindles will be exhibited by Pope Machinery Corp.'s Chicago representatives, Federal Machinery Sales Co., at Booth 392. These include the new Pope Super-Pre-

cision, heavy duty boring spindle which is capable of boring holes round within millionths of an inch. They come in both belt and motor driven types covering a wide range of speeds and horsepowers. (S30)

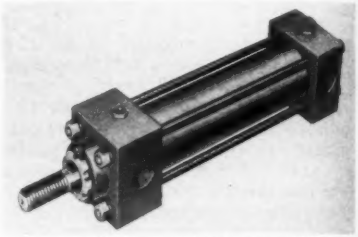
- The Micro-Height gage, combining the scribing features of a vernier height gage with quick reading figures, will be featured at Booth 1721 by The Greist Manufacturing Co., New Haven, Conn. It scribes, measures distances between holes or surfaces, greatly reduces the use of gage blocks, and reads directly in thousandths from 0-3" or up to 9" with risers. (S31)

- A dial bore gage setting master can be substituted for a number of fixed ring master gages. The adjustable anvil of the master is set by gage blocks to the desired dimension away from the fixed

anvil and can be changed from time to time. In addition to this setting master, a test indicator and a lead measuring gage for threads will be shown in Booth 1016 by Standard Gage Co., Inc., Poughkeepsie, N. Y. (S32)

- Federal Products Corp. of Providence, R. I., will display a complete line of dimensional measuring systems in Booth 496. Included will be the latest developments in electronic and air-electric machine control gaging, Dimensionair air gages, mechanical dial gages, and dial indicators. Machine control demonstrations in the booth will show various types of grinder control — cylindrical, center-type, and internal. (S33)

- Advanced designs in air and hydraulic operating equipment will be demonstrated at Booth 245 by Logansport Machine Co., Logansport, Ind. The recently developed lines of Ultra-matic and Ultra-mation air and hydraulic cylinders (illustrated) and the



new pilot-operated solenoid hydraulic control valves will be included, as well as Logan air and hydraulic valves, hydraulic cylinders, hydraulic power units and power-operated chucks. A special feature will be a demonstration of a new automatic machine for turning valve liners. (S34)

- Three milling machine models are to be shown in operation by Barker Engineering Co. of Cleveland at Booth 731. The new Barker Dual Mill is equipped with two ball bearing, heavy duty, totally enclosed 1/3-hp motors. A variable speed drive makes it possible to run either spindle at different speeds to accommodate the proper cutter for the milling operation desired. (S35)

- Information on Triple C cutting coolant will be available at Booth 1021. Being transparent and foamless, Triple C coolant enables the operator to watch the progress of the work. This coolant, which is water-soluble, nonoily, non-greasy, and non-flammable, was developed by The Motch & Merryweather Machinery Co. of Cleveland. The company's Triple-Chip Saw blades will also be shown at Booth 1021. (S36)

**Want Information?** For additional data on any of these products, Circle Key No. (in parentheses) on Inform-A-Gram Card, page 142.1

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AA-3375


CIRCLE INFORM-A-GRAM KEY NO. 105

# TOOL SHOW PREVIEWS

● An adjustable reference master for checking bore gages will take prominence at Booth 932, says Boice Gages, Inc. of Staatsburg, N. Y. In operation, the required

gage blocks are stacked and inserted and the unit is locked. Thus, a reference dimension is established that can be used as long as required. (S37)

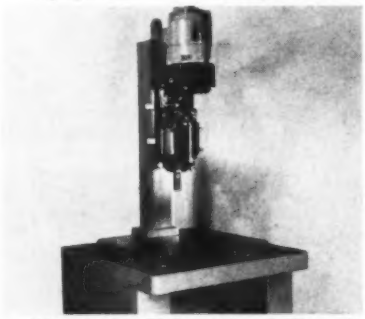
● A three-station grinding machine for burring and chamfering both the inside and outside edges of hypoid gear teeth will be introduced at Booth 613 by Modern Industrial Engineering Co., Detroit. Three ring gears are chamfered at a time on the machine, giving a production rate of 300 pcs/hr, and one operator easily handles all three stations. The latest developments in other Burr-Master gear deburring and chamfering machines will also be shown. (S38)

● The internal grinding attachment for the R-O Universal Form Relieving Fixture for form grinding internal cutting edges of hollow mills, trepanning cutters, etc. will be displayed with the R-O fixture

and grinder at Royal Oak Tool & Machine Co.'s Booth 278. Angular external surfaces of small cutters that cannot be conveniently ground with large wheels can also be form relieved with the device. (S39)

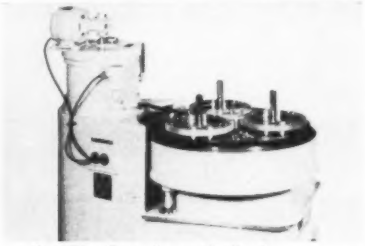
● Burg Tool Manufacturing Co., Inc., Gardena, Calif., maker of Burgmaster turret drills, is demonstrating its new Model 1C turret drilling machine at exposition Booth 389. This machine is designed to fill the need for a smaller, faster unit. It easily handles holes up to ⅜" in steel, has a 7" stroke, and a speed range of 325-4050 rpm. In addition, it features fast power indexing, sensitive feed, preselective speeds and stops, quick change tools, and ability to do any combination of six operations in one setup. (S40)

● This automatic drill press has been designed by Hause Engineering, Montpelier, Ohio, for automatically performing high production drilling, tapping, and other machining operations normally performed with drill press equipment. It incorporates a



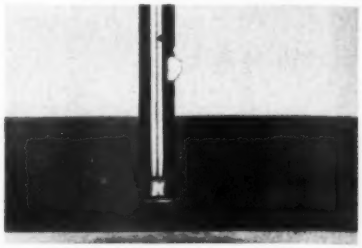
Model 24 Holomatic drill unit which has a 4" stroke and can hold depths to 0.0005". In addition to this equipment, a double end machine and a deep hole drilling Holomatic unit will be shown in operation in Booth 246. (S41)

● The Gyro-Matic 21 automatic flat lapping machine was primarily developed to eliminate a laborious, uncertain hand lapping process and also to lower the cost of manufactured parts through pro-



duction lapping. It features a removable circular abrasive tank with removable cover for easy cleaning and it will be shown at Booth 736 by Spitfire Tool Co. of Chicago. (S42)

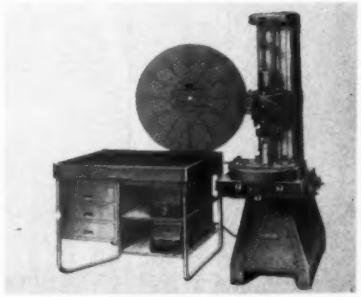
● The "BurrAway," a hole deburring tool which has been known to reduce deburring time as much as 90% and which functions as well on lower as on upper surfaces, will be the feature exhibit of Cogsdill Tool Products, Inc. of



Oak Park, Mich., at Booth 185. In operation, the tool cuts, collapses, then cuts again on the return stroke, efficiently and automatically removing burrs, both on top and underneath, without turning the work. (S43)

● A new type automatic blank feeder and stacking unit that orients by keyway or driving hole will be introduced at Booth 509 by the V & O Press Co., Division of Emhart Mfg. Co., Hudson, N. Y. The unit, designed to be used with V & O Model 410 notching machine, automatically transfers rotor or combination rotor and stator blanks from an oriented stack to the notching fixture. It positions the blank on the spindle, removes the notched blank, and stacks it. (S44)

● Shown at Booth 1020 will be the latest closed circuit television setup using the alignment telescope. It is being used experimentally by leading aircraft companies for jig and fixture alignment. In addition, Engis Equipment Co., of



Chicago will exhibit the Talyrond measuring instrument, the Talysurf surface measuring instrument, a microptic circular table, a micro-alignment telescope, and the Taylor-Hobson sweep optical square. (S45)

**Not Attending?** For additional data on any of these products, Circle Key No. (in parentheses) on Inform-A-Gram Card, page 142.1

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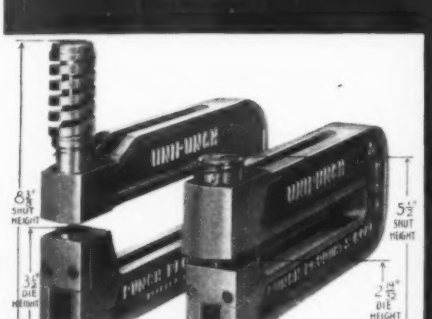

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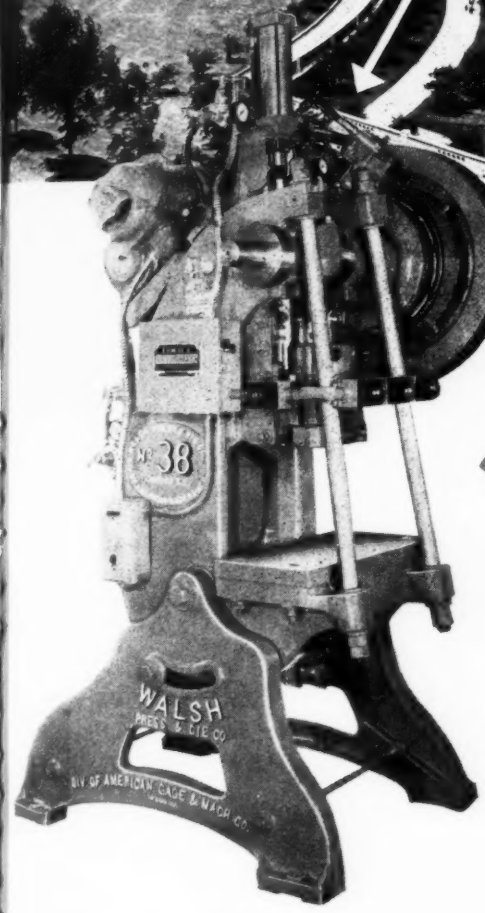
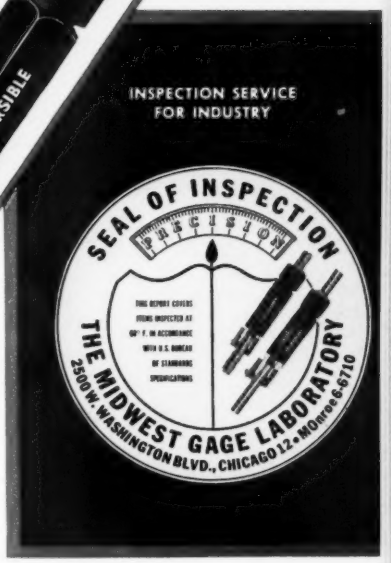



WALSH 38-Ton Air-Clutch High Production O.B.I. Press




Let our experience in the fields of production and precision prove beneficial to you and your product. Write or phone these Chicago firms for complete information about their important new products and services. In addition, all offer free engineering consultation services. There's no obligation on your part, of course.

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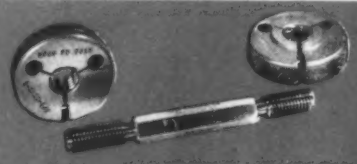
The finest inspection equipment available in this country!

SEAL OF INSPECTION — precision — THE MIDWEST GAGE LABORATORY — 2500 W. WASHINGTON BLVD., CHICAGO 12 • MOnroe 6-6710

Save in every way by using our "Complete Service".

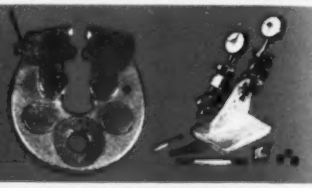
RAHN Black Granite Surface Plates — Angle Plates — Parallels

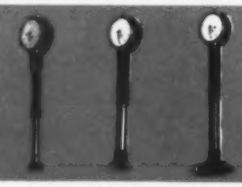
Reversible Plain & Thread Plug Gages — Gear & Thread Measuring Wires — Plain & Thread Rings — Special Gages



Thread Rings — Truncated Set Plugs — Standard Gages in Stock — Specials to order

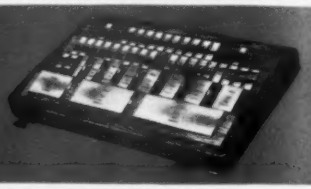
JOHNSON Roll & Ring Thread Snap Comparators and Fixed Gages





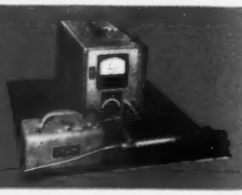
BOICE Dial Bore and Length Gages — Adjustable Masters — Dial Snaps

WEBBER Gage Blocks — Steel — Croblox — Angle Blocks — Calibrated to Millionths



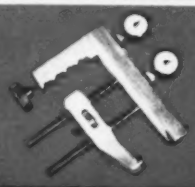
Centerless Lapping Machine — Tolerances to Millionths with ease

Profilometer
Waveometer
Proficorder
Andermeter



GEM Tool Makers' Indicators — graduated .001 — .0005 — .0001

Micrometers and Tool Makers' Supplies



RIEHLE Portable Hardness Testers — 2 sizes — Range 0-6", 0-12"

AMES Dial Indicators — Thickness Measures — Dial Micrometers — Hole Gages

## AMERICAN GAGE and MACHINE COMPANY

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CIRCLE INFORM-A-GRAM KEY NO. 110

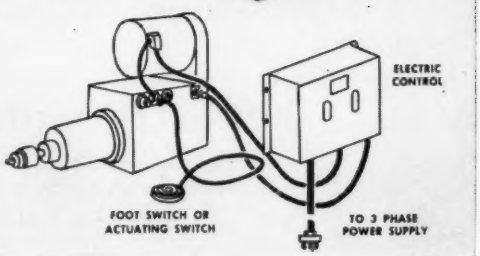
# NOW--TWO PRODUCTION TOOLS FOR THE COST OF ONE!

THE *New* DUMORE® SERIES 28

## "DRILL-N-TAP" UNIT

Now you can get two machines for the cost of one — a driller and tapper — all in the same automatic Dumore unit. What's more, you can mount work close to the fixture with little tool travel and get faster cycling . . . less unproductive idling time!

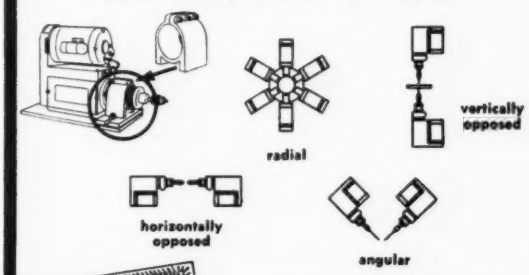
The *reversing motor* on the Dumore Drill-N-Tap Unit reduces wear and eliminates expensive clutches. In most instances, you can tap with the same drill fixtures and set-up by simply removing drill bushing. Just flip the control switch for either tapping or drilling. Tap fits into chuck — no extra tapping head is required.




### *Check These Outstanding Cost Saving Features!*

- No clutches to wear and replace
- Quick set-up on job after job
- Mounts practically anywhere — quickly
- Drills or taps at flip of a switch
- For long and short production runs
- Utilize same set-up for drilling and tapping
- Spindle speeds — 265 to 4900 R.P.M.
- Also mounts on standard drill press column for single spindle automatic driller and tapper

Unique nose mounting device for set-up in any position.




**WRITE FOR FURTHER DETAILS AND WHERE TO GET IT!**

**FIND OUT HOW OUR SERVICE ENGINEERS CAN CUT COSTS AND INCREASE YOUR DRILLING AND TAPPING PRODUCTION . . .**

**VISIT THE DUMORE BOOTH No. 678, ASTE TOOL SHOW March 19-23, International Amphitheater, Chicago**

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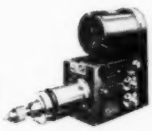
**You Can Save Hundreds of Dollars in First Cost Alone, With Any of These DUMORE Automatic Drill Units**

SERIES 24



**Fully automatic with all controls built-in.**

Ideal for production runs with varying conditions and frequent change-overs . . . For single or multiple unit operations. Pre-selected speeds, feeds, depth. Simple nose mounting bracket permits set-up at any angle — saves tooling and fixture costs.

SERIES 26

Identical in size and capacity to Series 24, with just basic controls built-in for long, uninterrupted production runs.

AUTOMATIC DRILL HEAD SERIES 20

- For high production drilling of small parts
- Eliminates drill breakage
- Automatic built-in controls
- No. 80 to 5/32" drill capacity

DRILL GRINDER SERIES 21

For fast, accurate sharpening of small twist drills. Capacity: all 2-lip twist drills—No. 70 to ¼", including crankshaft drills. Grinds included angles from 90° to 150°, clearance angles from 5° to 15°.

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Certified DUMORE APPLICATION SERVICE

. . . helps you get increased production and lower job costs. Write for FREE Dumore Application Analysis Kit.

DUMORE® PRECISION TOOLS

**AUTOMATIC DRILL UNITS • TOOL POST AND HAND GRINDERS**

1304 SEVENTEENTH ST., RACINE, WISCONSIN

CIRCLE INFORM-A-GRAM KEY NO. 111

# PRESS-LINE PACKAGE

## Features Automation PLUS Flexibility

ULLY INTEGRATED, automatic production lines may soon be as commonplace in the pressed metals plant as the multi-machine transfer lines have come to be for production of large-volume machined parts. While multi-station transfer presses have been used for years, the engineering — as a complete unit — of a multiple-press line with full automatic features has only recently been given much attention by Industry. But up to now, there has been more discussion than practice.

Indicative of the currently-accelerating trend in manufacture is an automated line of four individual tooled-up presses to be delivered as a package by Clearing Machine Corporation* for automatic high production of automobile wheels. The customer, Dunlop Rim & Wheel Company of Coventry, England, asked for a line that would (1) provide a substantial increase in production without a proportionate increase in labor, (2) be flexible enough to accommodate any conceivable product changes, (3) permit the addition of presses, or a change in operational sequence, and (4) permit use of presses for either automatic handling on long runs or hand loading on short runs.

The line designed by Clearing engineers provides maximum flexibility. The four individual presses are equipped with a feeding mechanism and an electrical interlocking system that integrate the four presses into a continuous production unit. Each of the presses, however, can be run independently of each other without using the feed. Furthermore, the presses can be rearranged in different combinations if that should ever become necessary.

The lead press is of 275-ton capacity; the other three, 600-ton capacity. Each of the four presses is equipped with a 50-ton pneumatic die cushion. Limit switches protect the equipment against any malfunction of cushions.

Blanks—14″ x 14″, of .116″ steel—are fed into the line by means of a stack feed at Station 1. A full basket of blanks (about 100 pcs) is loaded into a pneumatic elevator device directly above the feed stack. When the previous supply of blanks has been reduced to 6 pcs, a limit switch is tripped which lowers the basket onto the stack.

The basket is bottomless, and blanks rest on cams projecting inwards from basket sides. These cams are now pushed aside, and the basket's contents deposited on top of the stack. The empty basket is then returned to the top,

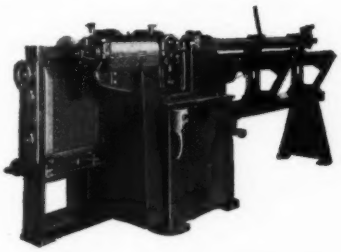
. . . *Continued on Page 130*

*Division of U. S. Industries, Inc.

**WIRE STRAIGHTENING SPECIALISTS FOR 90 YEARS!**

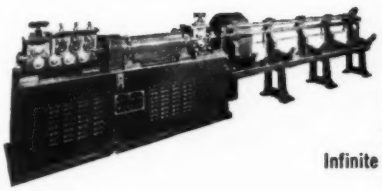
# SHUSTER wire straightening and cutoff news!

**SHUSTER — the first name in wire straightening and cutting, now presents a full range of *infinite variable speed* machines — first in the field again!**



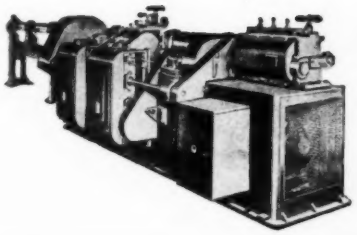
**SHUSTER 1 AV**

1/16" to 3/16" or 3/32" to 1/4" basic wire Geared to feed any speed from 50 to 200 feet per minute.



**SHUSTER 3 AV**

1/4" to 1/2" basic wire. Geared to feed any speed from 76 to 228 feet per minute. Infinite speed control of cuts per minute



**SHUSTER 4 AV**

3/8" to 11/16" basic wire. Geared to feed any speed from 90 to 180 feet per minute. Infinite speed control of cuts per minute.

**INFINITE VARIABLE SPEED DRIVE!**

Infinite feed changes and control.
The speed you want when you want it.
Constant speed maintained when set regardless of load variations.

**ELECTRICALLY CONTROLLED CLUTCH AND TARGET!**

Fewer wearable parts.
Roll type mechanism.
Solenoid actuated, feather touch control!

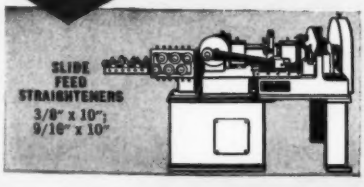
**MINIMUM MAINTENANCE!**

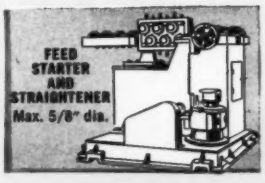
Frees operator from worry!
*Speeds Production!*

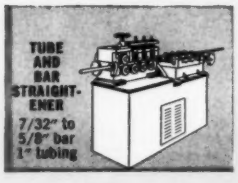
**Send for FREE wall size split gauge wire chart from 41 gauge to 7/0**

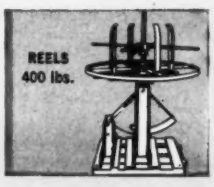
**METTLER MACHINE TOOL, INC.**
150 West Adeline Street, New Haven, Conn.

**This too is SHUSTER.**




CIRCLE INFORM-A-GRAM KEY NO. 113

NEW

# PEM self-clinching template drill bushings

## Save time . . . . . Cut costs

**For faster, easier installation** in thin gauge aluminum or cold rolled steel templates. (one third conventional thickness)

**Pay for themselves in assembly savings.** Only one hole is required for each bushing—the hole to be bushed. Then, simply drop bushing in hole and squeeze into place.

**Self-clinching,** PEM Bushings are compression mounted and positively locked into position—one or several at a time.

**Round, one-piece, hardened steel precision units**—not assemblies. Require no indexing or nesting; No tabs, straps or other outboard supports; no locating, punching or drilling and countersinking of rivet holes; no riveting, hence no danger of "cocking" during riveting.

**No special machinery or skilled labor required.**

**True alignment and center distances** are automatically secured by piloting effect of leading edge of shank and interference fit.

**High torque and pull out resistance** are provided by back-tapered shank and corrugated clinching ring.

**Complete line** for drill sizes from .052 to .500

**PENN ENGINEERING & MANUFACTURING CORP.**

Doylestown, Pennsylvania

***Write for literature*** ***Ask for trial samples***

PEM

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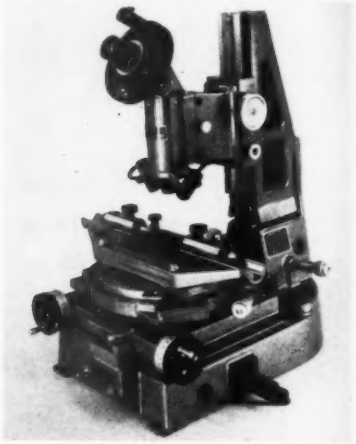
## TOOL SHOW PREVIEWS

- This toolmakers' microscope is used to detect and measure errors in cutting tools, inspect threads and thread gages, measure critical dimensions on machine and instrument parts, and measure



various types of production tools. The object is viewed through the microscope enlarged 30 times. The Gaertner Scientific Corp. of Chicago will display the microscope in Booth 1126. (S46)

- Gear measuring equipment manufactured by The Fellows Gear Shaper Co., Springfield, Vt., will be shown at Booth 544. These include a lead measuring instrument, involute measuring instrument, Red Liner, fine-pitch Red Liner, inspection instrument, and Fellows automatic pinion checker. (S47)

- For ultra-precise measurement and inspection, the new Moore Universal Measuring Machine offers capacity for larger workpieces, choice of electronic indicator supported on a rotatable spindle or a universal microscope,

and a combination of rectilinear and angular positioning, for measuring most complex contours. It is to be introduced at Booth 1430 by Moore Special Tool Co., Bridgeport, Conn. (S48)

# Reorders prove... DOLLAR for DOLLAR you get *More* with FELLOWS Molding Machines

Leading molding shops coast-to-coast use Fellows Injection Molding Machines because they know they can depend upon Fellows machines to deliver high level performance week after week...year after year. They prove their faith in Fellows superiority by ordering Fellows equipment when they expand – the greatest testimonial to the opportunity for more profits with Fellows.

Get the whole story from the Plastics machine specialist in any Fellows office. It can mean money in your pocket!

**More PRODUCTIVITY**

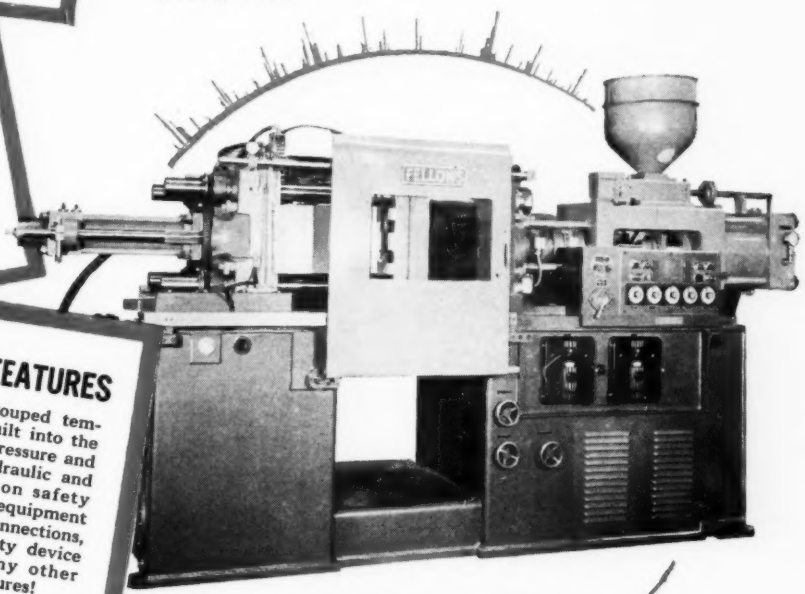
with tight production schedules the "6-200" is the fastest automatic FULL 6 OUNCE machine on the market! Fully automatic feature allows one man to operate 3 or more machines. Speed-Flo heating cylinder delivers "dry-run" speeds from 490 to 650 cycles per hour.

**More VERSATILITY**

"pre-pack and pre-position" device—optional on the "6-200"—brings plunger halfway forward during press dwell, providing up to 8 OUNCE "SHOTS". The "6-200" takes 12" x 24" molds horizontal, 15" x 21" vertical, 8" x 14" thick.

**More PLUS FEATURES**

the "6-200" has grouped temperature controls built into the machine, injection pressure and speed controls...hydraulic and electric interlocks on safety doors...and as extra equipment —counter air blast connections, alarm timer and safety device for mold...plus many other Fellows exclusive features!



FELLOWS "6-200"

Fellows

**injection molding equipment**

THE FELLOWS GEAR SHAPER COMPANY, Plastics Machine Division, Head Office and Export Department, Springfield, Vermont
Branch Offices: 319 Fisher Building, Detroit 2 • 5835 West North Avenue, Chicago 39 • 2206 Empire State Building, New York 1
6214 West Manchester Avenue, Los Angeles 45

CIRCLE INFORM-A-GRAM KEY NO. 115

. . . Coolants from page 82

are not soluble in these hydrocarbons.

Vitrified abrasive sticks normally have high compressive strength as compared with their resistance to shear. In steels alloyed for toughness, the reverse is true. In Microhoning hardened steel, it is difficult to obtain grit penetration unless "soft" bonds and extremely friable abrasive is used to keep the grit sufficiently sharp to penetrate the material. It is usually desirable to restrict the penetrating depth of the grit within the ability of the bond to carry the force of the cut without premature fracture of the bond or grit and consequent greater-than-necessary abrasive wear.

Operating speed, abrasive pressure, and sharpness of the grit all affect grit penetration. The first two may be controlled. The latter, however, is apt to be sporadic due to variations in fracture of the grit, and the changing condition of the workpiece surface. If allowed to chatter, even a hard-bonded stick may disintegrate without performing useful work. To guard against this, and to enable the use of efficiently-friable abrasives, it is advantageous to use lubricant additives or retardants in the coolant. These may be rightly termed "buffers," as they serve to absorb shock or recoil occasioned by rapid force-fluctuation.

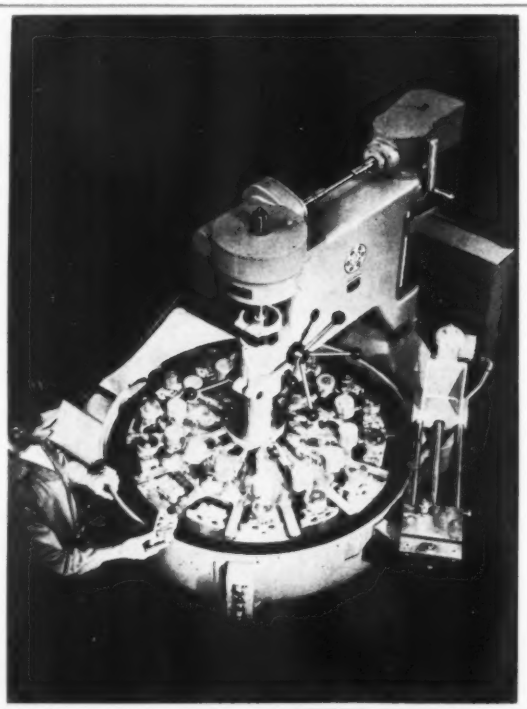
Animal oils are regarded as having maximum lubrication value. These oils, commercially named lard oil, neatsfoot oil, and tallow oil are glycerides of fatty acids. If they decompose, fatty acids (oleic and stearic acid) are produced and rancidity results. High acid content of a coolant promotes gumming, and even if highly diluted, may cause discoloration of copper-bearing metals. Tallow oils, lanolin (wool fat) and the higher-grade lard oils, while initially high in cost are generally more economical, due to their long period of usability.

One characteristic of animal oils, not usually found in other types, is a tendency to cling to surfaces and not flow under pressure. Their use in heavy-duty cutting oils is as commonplace as is their presence in heavy-duty mineral lubricants.

Animal oils are graded and priced upwards according to their reduction in free fatty acids. They are also sold as mineralized lard oil, lardoleum, etc., in which instances they are compounded with mineral oils. These, and straight animal oils, when used as additives to kerosene, paraffin oil, or mineral spirits form a "soft" Microhoning coolant. The higher the percentage of the additive used, the greater its buffer or anti-chatter effect. The usual percentage of these additives ranges from 5% for soft, low-tensile metals to 50% for hard, high-tensile metals.

When Microhoning soft but tough metals, high "oiliness" alone, of the coolant, is frequently insufficient to prevent chip-to-tool fusion. In such cases chemically-active additives are especially beneficial. They, supposedly, form the vital anti-weld metal-chemical

. . . Continued on Page 120

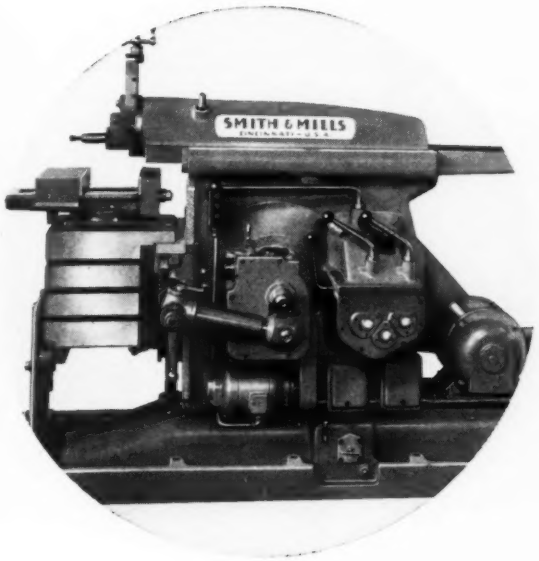


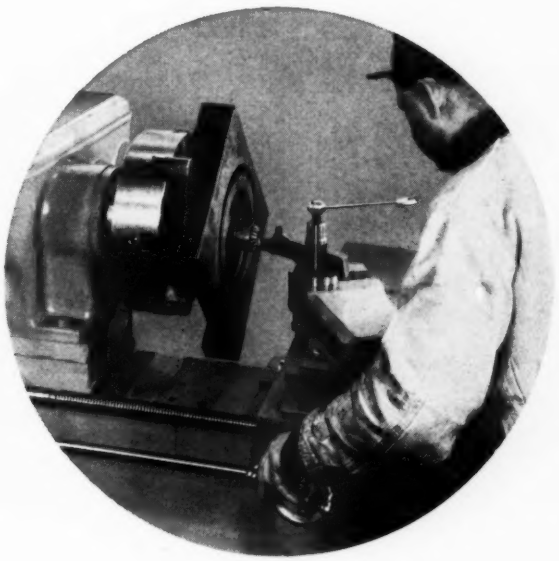
This Microflat machine setup is particularly adaptable to flat, mating surfaces that must hold a leak-proof seal when bolted together without gaskets. The surfaces are made flat with a functional "mat" finish (a dull but even surface having "sealing" characteristics when assembled to a similarly finished surface).

The bonded abrasive wheel and the fixture may be rotated in opposite directions or in the same direction, depending on the condition of the part and the type of finish required. The fixture is oscillated across the wheel to insure maximum abrading action and uniform wear on the wheel.

# NEBEL MACHINE TOOL CORP.

## now manufactures these fine Smith & Mills shapers . . . and Nebel engine, removable block gap and extension bed gap lathes



**Speed, cutting power, versatility** and precision performance. That's what our customers look for—and get—in Smith & Mills Shapers.

Heavy Duty Models in 16″, 20″, 25″, 28″, 32″ and 36″ strokes, and Standard Duty Models in 20″ and 24″ strokes . . . for tool room and production work. For complete information including prices, deliveries, repair parts or field service, write or wire us today.

**Double duty removable block gap lathes** give you standard engine lathe turning, plus the bonus of 48% more capacity. The 16″/27″ model, for example, gives you 9″ extra swing within a 15″ wide gap. Yet it costs only a few dollars more than the average engine lathe. 20″/30″ and 25″/40″ removable block gap, extension bed gap and engine lathes also available. Write for descriptive bulletins.

Smith AND Mills SHAPERS CINCINNATI

Nebel LATHES CINCINNATI

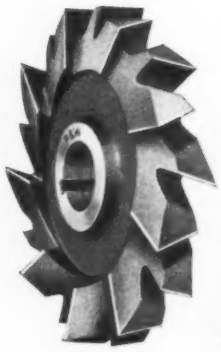
**NEBEL MACHINE TOOL CORP.**

**3401 Central Parkway, Cincinnati 25, Ohio**

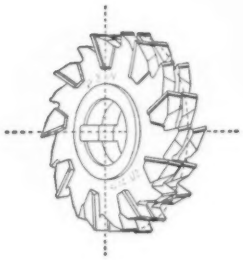
**Smith & Mills Shaper Division** **Nebel Lathe Division**

CIRCLE INFORM-A-GRAM KEY NO. 117

# *All New* DESIGN
## in staggered tooth
# SIDE MILLING CUTTERS
## with traditional
## PRATT & WHITNEY high quality



OLD DESIGN



MANY COMBINATIONS POSSIBLE WITH NEW P&W DESIGN

All P&W Staggered Tooth Side Milling Cutters of the same diameter have the same number of teeth and all keyways are located alike. By simply grinding the mating hub faces, 2 or more cutters (of the same or various widths) can be interlocked side by side to produce a very wide choice and range of widths. The results are: greatly reduced inventories, fewer special orders, fewer delays, greater convenience and lower tool costs. (Notice too the new raised lands on all cutting edges to permit faster and more economical grinding.)

PRATT & WHITNEY COMPANY
INCORPORATED
15 Charter Oak Boulevard, West Hartford 1, Connecticut
Direct Factory Representatives in Principal Cities

MACHINE TOOLS • GAGES • CUTTING TOOLS


## TOOL SHOW PREVIEWS

- The Gem drawing table has a top that is adjustable through a range of 80° from the horizontal. Height adjustment is from 30" to 40". Two top sizes are available, 24" x 36" and 30" x 42". For storing, the top is set at the vertical position. This sturdy table and other drafting equipment will be displayed in Booth 1036 by Mayline Co. Inc., Sheboygan, Wis. (S49)

- The horizontal-vertical grinding unit being shown at Booth 574 chucks right into the spindle of the standard Elox electrical discharge machine. With it, the brass grinding wheel can be positively positioned in a horizontal,

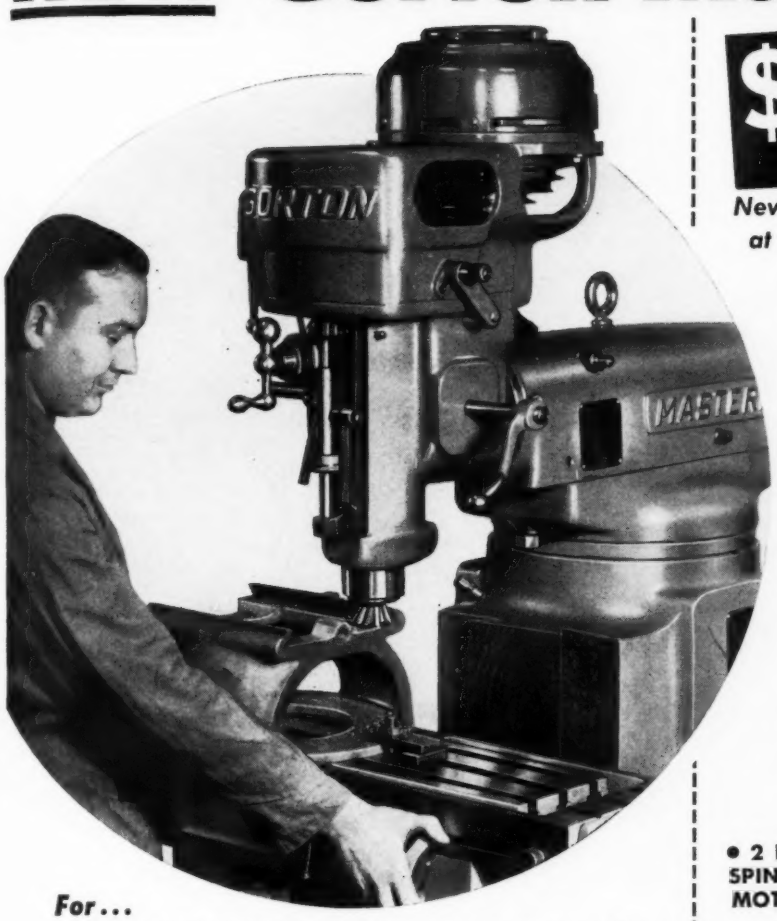
45°, or vertical plane. By revolving an electrode, the fixture can be utilized for drilling perfectly round holes. Both the electrical discharge machine and attachment are products of Elox Corp. of Michigan, Clawson, Mich. (S50)

- An expanded line of Kendex Tooling — 17 styles, available in over 100 tools — will be featured by Kennametal, Inc., Latrobe, Pa., at Booth 475. Holders with positive and negative rake, heavy duty types, and a complete line of button type inserts designed for a broad range of applications will also be shown. (S51)

- A line of uniquely lapped black granite surface plates will be exhibited by Collins Microflat Co., Los Angeles, in Booth 912. Seizure of gage blocks and checking fixtures, which has occasionally occurred when using granite sur-

face plates, has been eliminated by the lapping method to provide a continuous bearing surface interspersed with micronic valleys. These minute reliefs afford sufficient air pocket relief between bearing surfaces to prevent seizure of instruments. (S52)

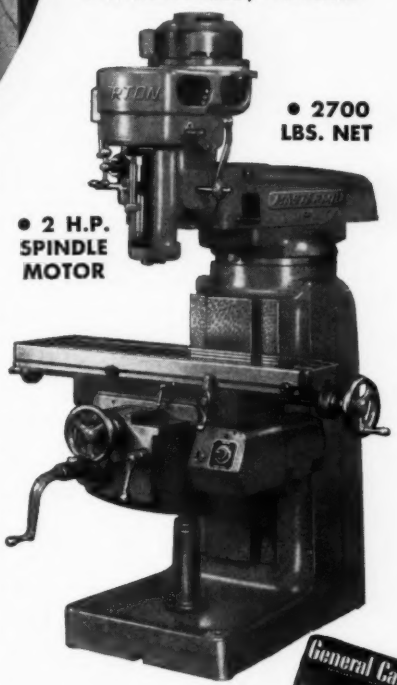
# NEW Gorton Mastermil




**$2750**
(WITH ELECTRICS)

***Never before a machine like this at a dollar a pound!***

- PRECISION SPINDLE; 10 SPEEDS, 80-5600 R.P.M. *STANDARD*
- DESIGNED AND BUILT TO PROVIDE SUSTAINED ACCURACY
- LONGITUDINAL FEED, 22 INCHES
- SADDLE LENGTH, 24 INCHES
- CROSS FEED, 10½ INCHES
- VERTICAL FEED OF KNEE, 15¼ INCHES
- SPINDLE FEED, 4 INCHES



- 2700 LBS. NET
- 2 H.P. SPINDLE MOTOR

***For...***

Milling, boring, duplicating in tool rooms, model shops, pattern shops, production lines, general machine shops, experimental laboratories, machine shops, schools — wherever high-speed vertical milling is done.

***Also available...***

Infinitely variable spindle feed from ¼ inch to 8 inches per minute.

Infinitely variable table feed (longitudinal) in 4 ranges: from ½ inch to 60 inches per minute.

*Ask for special bulletin, No. 2699, on new Gorton Mastermil and for general catalog, 1203-1655, covering the entire Gorton line.*

**A.S.T.E. show visitors are cordially invited to visit the Gorton plant in Racine—one hour's ride on the Northwestern Railroad.**

GORTON

GEORGE GORTON MACHINE CO.

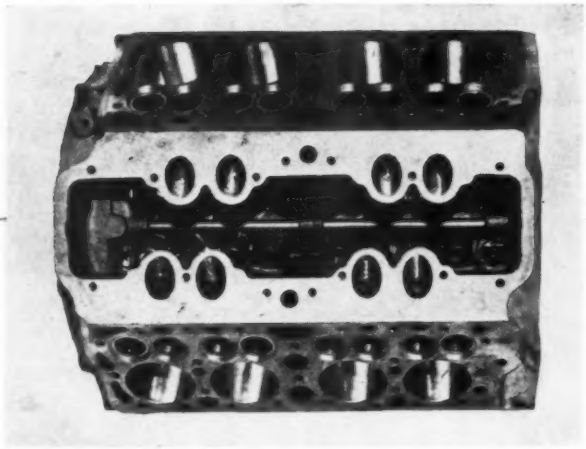
1203 RACINE STREET, RACINE, WISCONSIN, U.S.A.

SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special . . . Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

A 8732-1P

CIRCLE INFORM-A-GRAM KEY NO. 119



For reciprocating engine cylinders the functional surface characteristics are:

A surface which will quickly become compatible with the piston rings to form a seal that will hold the pressure produced by the burning fuel;

A surface that will have long-wearing qualities and maintain an efficient seal;

A surface that will not pump oil, yet will retain enough to lubricate the rings.

In attaining these characteristics, Microhoning generates:

A round and straight surface of controlled roughness (automobile manufacturers' specifications vary between 18 and 35 micro-inches) to promote a rapid "wearing-in" until full contact and a tight seal are obtained;

A surface conducive to long wear because, after the rings and cylinders have become compatible, there is no torn, burned or smeared metal that might scuff, flake or break down to destroy the seal;

A cross-hatch surface pattern of numerous minute reservoirs to provide lubrication while preventing blow-by.

. . . Coolants from page 116

compounds characteristic of EP (extreme pressure) lubricants. Chemically-active coolant additives contain either sulphur, chlorine, phosphorous, or a combination of them. As a rule, sulphurized lard oil combined with mineral oil, the compound commercially called "base oil," is satisfactory as an active additive for Microhoning coolants.

Generally speaking, a high lubricating or buffer effect in the coolant tends to:

1. Make the abrasive act harder, produce smoother finishes and require higher operating pressures or lower rotating speeds.

2. Lower its capacity to dissipate heat, complicate coolant distribution, to require refrigeration, and to necessitate swarf separation.

Thus, the use of too much buffer may detract from its otherwise beneficial effect. A gradual increase in the percent of additive is advised. When improvement ceases to be apparent, in actual operating results, its beneficial limit is reached.

The solvent action of kerosene and paraffin oils or mineral spirits is no less effective upon the oils in human skin. The loss of this oil may cause irritation, called dermatitis, which is not necessarily due to bacterial contamination. Nonetheless, it is the first step toward septic infection which is much more serious and eruptive than mere depletion of the skin oils.

Unless persons possess particular allergies, there is no necessity for skin irritation or infection if reasonable precautions in the preparation of the coolant and sanitation in its use are observed. Straight solvent-type coolants should rarely be used, even though they may be satisfactory from the mechanical standpoint. The addition of 3% or more of lanolin (wool fat) or a high-grade lard or sperm oil will substantially lessen the skin irritating tendency of the coolant.

Of next importance is the practice of sanitation, not necessarily involving the use of germicidal solutions so much as cleanliness in the handling and the use of the coolant. Periodic pasteurization (heating to 145° F for one-half hour) and frequent filtration to remove sludge and solids are helpful. Rancidity promotes bacterial growth; here, germicides may be of value.

# *Introducing the* COMET II

## An Advanced Conception of Valving by Ross!

- Direct solenoid operated, balanced spool 4-Way—for air or oil service.
- Engineered and built to tolerances of .0001".
- Conforms to JIC standards.
- Complete valve cycle within 0.033 sec.
- Made of aluminum—single solenoid, base mounted weighs only 3½ lbs.
- Working surfaces almost as hard as a diamond.
- Small and compact—7¼" by 3½" by 3⅞". ¼" diameter flow capacity.
- Available with ¼" or ⅜" pipe tap for inline, manifold or base mounted; single solenoid spring return, double solenoid momentary; double solenoid three position.

*Write, wire or phone for complete information*

ROSS Control VALVES

*See the New Comet II at the ASTE Show, Booth 696.*

**Ross OPERATING VALVE COMPANY**

123 E. GOLDEN GATE AVENUE - DETROIT 3 - MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 121

Bausch & Lomb
BENCH COMPARATOR
$765

*So easy, inexperienced help become*

**SKILLED INSPECTORS**

*in a single afternoon!*

Speed production of precision parts with this simple, time-saving *optical* inspection tool. No complex set-ups, no holding fixtures needed for most work. With exclusive under-stage illumination you simply lay work on table—see accurately magnified silhouette at comfortable eye level. Performs equivalent of several different mechanical inspections in one quick, easy visual check. Instantly reveals costly production errors. Reads to .0001" with optional micrometer stage.

**SEE FOR YOURSELF IN ON-THE-JOB DEMONSTRATION!**

For full information and obligation-free demonstration, call your local Do-ALL Sales Service Store, or write: The Do-ALL Company, 254 N. Laurel, Des Plaines, Illinois . . . exclusive sales and distribution agents.

BAUSCH & LOMB
SINCE B&L 1853

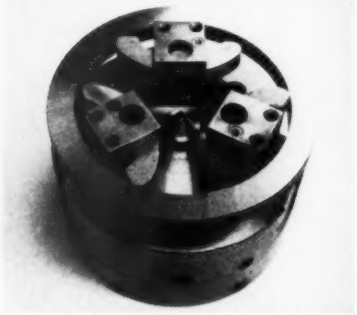
*Quality Control*
**INSTRUMENTS**

Visit Bausch & Lomb Booth 1032, American Society of Tool Engineers Convention, Chicago, March 19-23.

CIRCLE INFORM-A-GRAM KEY NO. 122

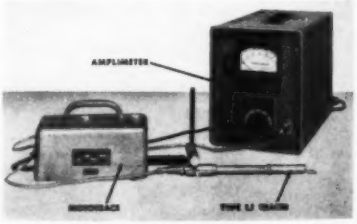

## TOOL SHOW PREVIEWS

- By reducing the friction and simplifying the number of parts that compensate, Buck Tool Co., Kalamazoo, Mich., has developed a new compensating chuck with true equalization. Its features include ease of changing from one diameter to another, increased



gripping power, and possible use as a standard power chuck when required. It operates equally well with the machine running or stopping, allowing automatic loading and unloading of the machine. The chuck's center can easily be set dead true. See it at Booth 650. (S53)

- Carboloy Department of General Electric, Detroit, will announce three items in Booth 1318: A new milling grade carbide, a new cutting tool grade carbide, and availability of a limited number of sizes of cemented oxide tool tips for testing and evaluation. The Department will also exhibit cemented carbide cutting tools; wire drawing, blanking, drawing, forming, and piercing dies; wear-proofing applications; GE vacuum melted metals; Thermistors and Thyrite Varistors. (S54)
- Profilometer Group II equipment will be displayed for the first time in Booth 774. This versatile portable equipment combination is used for measuring surface roughness in the shop. It will measure more than 85% of all the varied surfaces produced by




industry. This equipment, which is manufactured by Micrometrical Mfg. Co. of Ann Arbor, Mich., includes an amplimeter, a Type LJ tracer, and a Mototrace for mechanical operation of the tracer. (S55)

**EASIER FEEDING!**
**BETTER DIE ACCURACY!**
**CURL-FREE STOCK resulting in**
**FLAT UNIFORM PARTS!**

You get them ALL with this

# benchmaster Koil-Kradle STRAIGHTENER Combination!

The Benchmaster Koil-Kradle Straightener Combination is the answer to automatic punch press set-ups using coiled stock. It provides two valuable functions . . . *supplies a slack loop from which any machine can freely draw* and *simultaneously flattens the stock!*

Power-driven rolls in the Koil-Kradle automatically unreel stock as required. This material is then pulled through a series of 7 power-driven straightening rolls by means of two pinch rolls, forming a slack loop between unit and press or other machine being supplied. As the slack loop tightens, an actuating bar triggers a microswitch and a new loop is automatically formed. The Koil-Kradle Straightener combination can also be adjusted to run continuously using the variable speed drive.

Automatic feeding devices have no resistance to overcome. All drag against the weight of a heavy coil is eliminated. The material, being flat and entirely free from curl, feeds easier and insures better accuracy—particularly on jobs utilizing progressive or compound dies. Finished parts, too, are superior because of improved flatness.

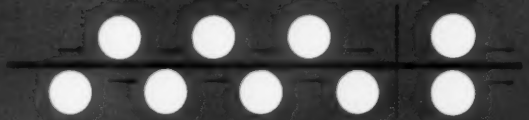
**See your Benchmaster Dealer for prices and recommendations or write direct to factory.**

## STRAIGHTENER FEATURES

**VARIABLE ELECTRONIC TIME DELAY**—Eliminates constant stopping and starting of motor as slack loop is consumed . . . keeps powered rolls rotating for any desired duration up to 10 seconds after actuator bar trips microswitch, reforming new slack loop.

**VARIABLE SPEED DRIVE**—Feed rate can be adjusted up to 100 fpm, accommodating various stock thicknesses. Special speeds are available on request.

**REVERSIBLE FEED**—Stock can be fed in both directions permitting re-reeling when desired as greatly facilitating set-ups. On many special applications the straightener can be used to feed material in either direction.



**EASY LOADING**—Top rolls lift [illegible] released position, permitting stock to be instantly inserted in a straight line between the complete series of straightening rolls.

**QUICK RELEASE**—A convenient lever effects instant release of roll pressure on stock and simultaneously shuts off all power.

**INDIVIDUAL ROLL ADJUSTMENT**—All top rolls may be individually adjusted for thickness and type of stock.

**ALL ROLLS POWER DRIVEN**—Roller chain and sprocket drive powers all rolls, insures smooth power transfer and quiet operation at any roller height adjustment. No gear trains to set up or get out of pitch line adjustment when roll settings are altered.

**ROLLS HARDENED AND GROUND**—The 7 straightening rolls and 2 pinch rolls are hardened and ground for long life and smooth surface to prevent marking of stock.

**ANTI-FRICTION BEARINGS**—Needle type roller bearings are used throughout.

**benchmaster**

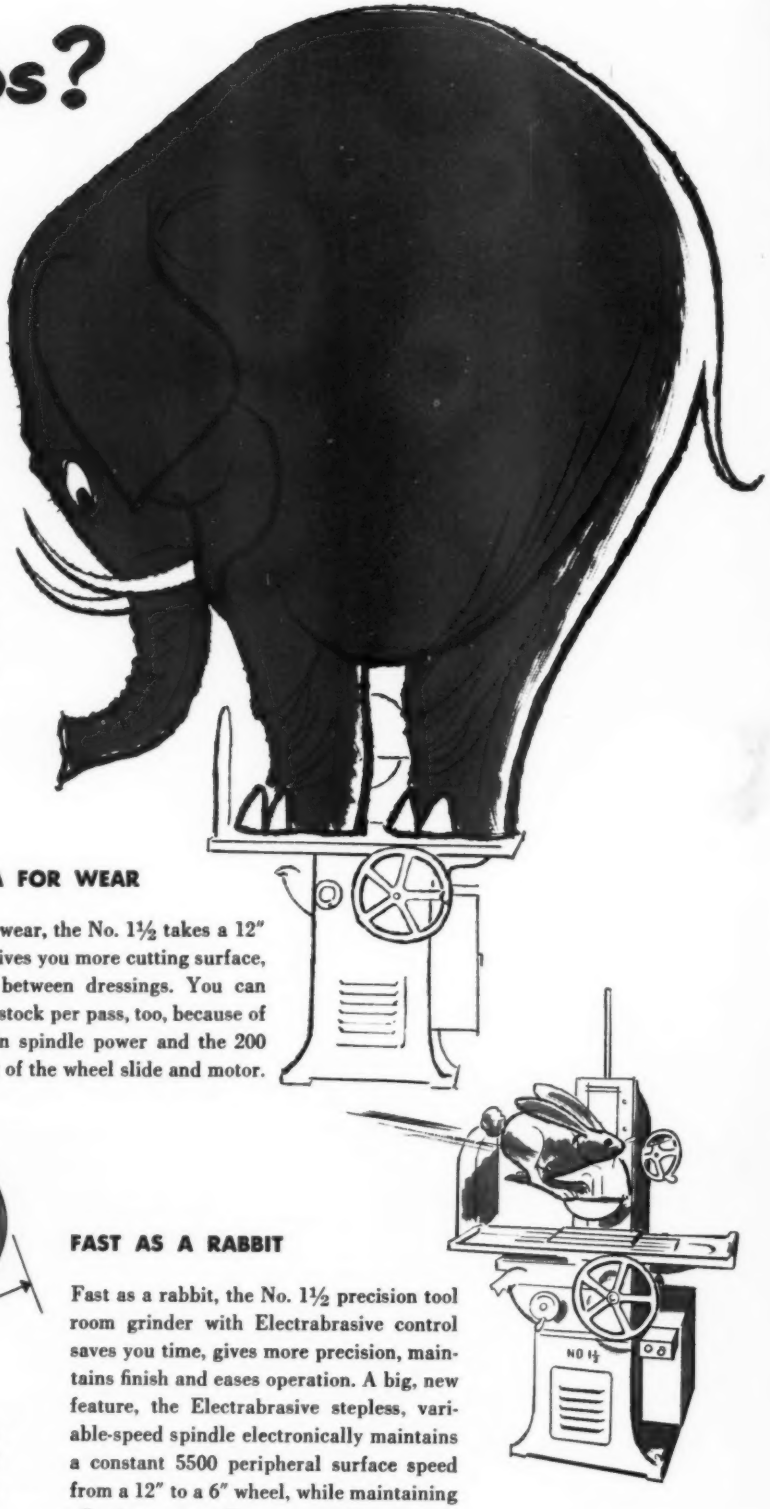
World's largest manufacturer of small punch presses and mills.

1835 W. Rosecrans Avenue, Gardena, California

CIRCLE INFORM-A-GRAM KEY NO. 123

# Jumbo Jobs?

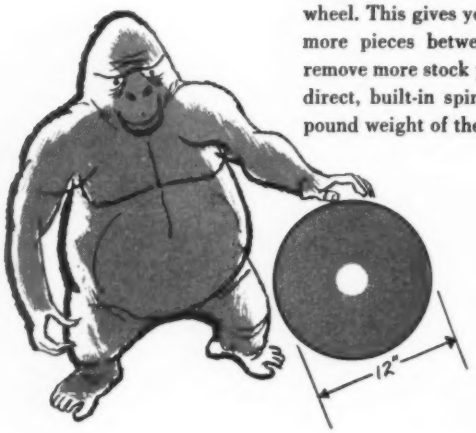
## Sure . . . on an ABRASIVE No. 1½



Because the Abrasive 1½ table has a 10" x 15" chuck with a full 150 square inches of surface area. A big handfeed grinder designed to do more, more easily, the 1½ gives you a full 12" capacity under the wheel. A lot of grinder for the money.

### A GORILLA FOR WEAR

A gorilla for wear, the No. 1½ takes a 12" wheel. This gives you more cutting surface, more pieces between dressings. You can remove more stock per pass, too, because of direct, built-in spindle power and the 200 pound weight of the wheel slide and motor.







### FAST AS A RABBIT

Fast as a rabbit, the No. 1½ precision tool room grinder with Electrabrasive control saves you time, gives more precision, maintains finish and eases operation. A big, new feature, the Electrabrasive stepless, variable-speed spindle electronically maintains a constant 5500 peripheral surface speed from a 12" to a 6" wheel, while maintaining effective torque. To operate all you do is set the knob on the wheel head!

*A two-cent post card will bring you this whole story on the BIGGEST little grinder on the market.*

**ABRASIVE**
**Machine Tool Company**
East Providence 14, R. I.

*For Forty Years*
*First For Accuracy — Economy*

ABRASIVE
ACCURACY POWER ECONOMY

CIRCLE INFORM-A-GRAM KEY NO. 124

# JOHANSSON GAGING EQUIPMENT

**Assures You Precision to the Finest Degree to Meet Your Requirements —Backed by the Name Supreme in the World of Measurement.**

### GAGE BLOCKS

**(JOHANSSON) and accessories.**
Short deliveries. Inspection and reconditioning service available at our plant.

### INTERNAL INDICATORS

(for inside measurements .155 to 24 inches) Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

### MIKROKATOR

(Amplifier—for outside measurements) Graduations .0001 to .000002 or .001 M to .0002 M.

### OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.

***Write for Literature***

## C E J MIKROKATOR 502-E

Mikrokator No. 502-E is a precision instrument for dimensional measurements.

It is provided with a mechanical, frictionless amplification device without sliding bearings or gears and there is no play, wear or binding.

The purpose of the instrument is to give accurate measurements both in mass production checking and in checking individual parts.

The instrument is made in three different designs and in both inch and millimeter.

| Cat. No. | Range | Graduated | Shaft Diameter |
|---|---|---|---|
| 502-E-2 | .016 | .0002 | 3/8" |
| 502-E-4 | .004 | .00005 | 3/8" |
| 502-E-5 | .002 | .00002 | 3/8" |
| 502-E-6 | .0012 | .00001 | 3/8" |

## C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.

**10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.**

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## Made From Solid . . .
## User-Inflated . . .

# TUBE-IN-STRIP

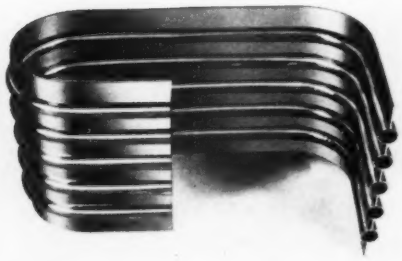


Fig. 1. Inflated Tube-In-Strip, formed on a multiple die, hand bends after inflation using normal tube bending techniques. It is shipped to customers uninflated in coils or sheets. Possible applications are in refrigeration, heating, and electronic fields.

TAKE A SINGLE STRIP OR SHEET of solid copper, brass, or aluminum, run it through Revere Copper & Brass' latest process discovery, and you'll come up with Tube-In-Strip, a brand new metal strip product with inflatable tubes. Applications in the heat exchanger field alone should be limitless.

Tube-In-Strip is made of one piece of metal only. As produced by Revere, coils and sheets of it are not discernibly different from the standard strip and roll products normally produced in the rolling mill.

It has incorporated within it, however, expandable portions which can be inflated by the user into continuous running lengths of tube of whatever size and spacing or combinations of sizes and spacings needed. It does not consist of two pieces of metal brazed, welded, and rolled together.

By shipping Tube-In-Strip in coils or in cut flat sheets uninflated, substantial economies can be realized. Inflation techniques are flexible and generally simple. The user inflates the strip by inserting a needle into the end of a channel and then applying air or hydraulic pressure. For a thin-walled tube, air pressure may be adequate while for heavy walls, hydraulic means may be better.

Fig. 2. A section of Tube-In-Strip formed for possible use in a car or truck radiator. Numerous channel patterns are available in copper, brass, or aluminum.

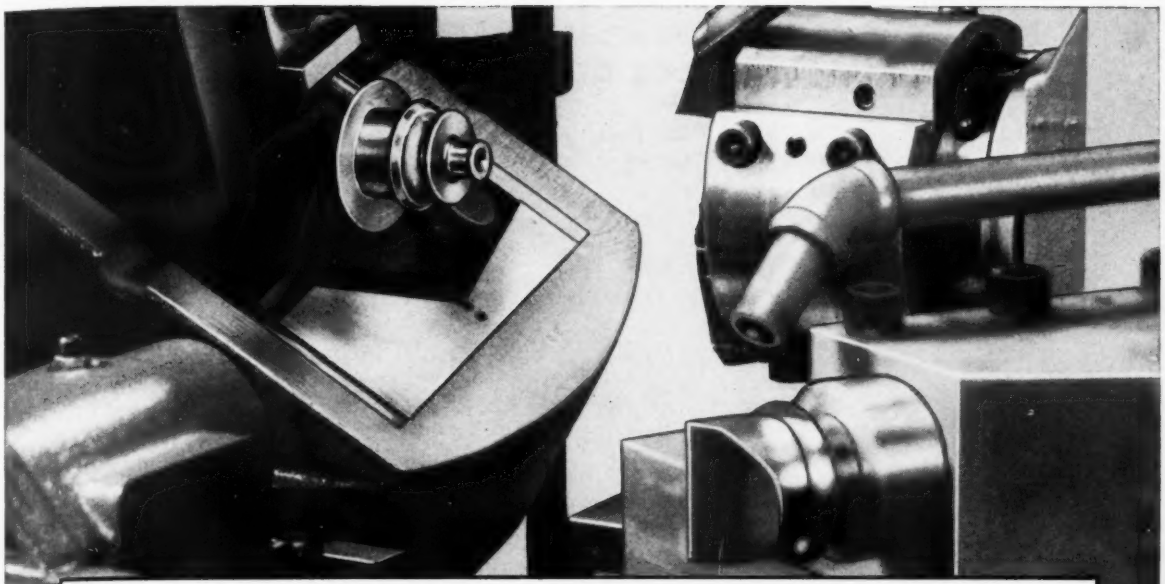
Tube spacing, Revere reports, generally can be as close as ¼" and even closer in some instances, and as widely apart as the width of the metal permits. Inside diameters of the tubes can vary from approximately 3/16" to ⅝" inclusive, when unexpanded. Tube wall gauge can vary from .0025" to whatever the inflation equipment permits.

A feature of the material is the fact that tube diameters can be varied within a single piece of metal; all can be made alike if desired, or each adjacent tube can be of different size, or one side can be flattened. These variations afford unlimited design opportunities.

All tubes in a given width of strip can be inflated simultaneously by the user, or as desired. Free inflation produces a wholly round tube. A profile die, or free inflation between flat plates, holding the metal in restraint, is used for dimensions and contours other than round.

Stamping, forming, bending, and drawing operations can be performed on Tube-In-Strip before inflation, or the material can be inflated before bending, perforating, and similar operations. Then, further processing is done by common pipe and tube bending techniques.

Tube-In-Strip can be joined by means of normal commercial techniques. Manifolds, for either series or parallel flow, are easily produced either before or after inflation, and return bends can be brazed, soldered, or welded readily.



# From PROBLEM to PROFIT

*in just 3.59 minutes . . . with a*

# POTTER & JOHNSTON 6DRE-40

## Automatic Chucking Turret Lathe

**HERE ARE THE FACTS**

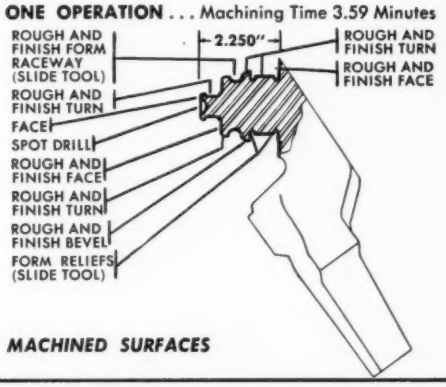
**PART:** Cutter Bit Arm

**MATERIAL:** 4812 Steel Forging

**REQUIRED:** 18 separate, precision cuts . . . including some "fussy" single point form turning.

**COMPLETED:** Quickly, economically in 1 completely automatic cycle!

**ONE OPERATION** . . . Machining Time 3.59 Minutes




***HEAVY LINES INDICATE MACHINED SURFACES***

And remember, this is *not* an exceptional, "done-for-the-record" case history. It's a regular production job that typifies the day-in-day-out performance you can count on because a P&J 6DRE-40 has the advanced design, added rigidity, extra speed and power, and versatility to take tough jobs in stride. And when you team this P&J Automatic with tooling engineered by P&J Specialists, you really have a cost cutting, profit building combination.

**SEND NOW FOR COMPLETE INFORMATION**

Write today for your free copy of Bulletin No. 159 describing the P&J 6DRE-40 in detail. Complete engineering data is included.

*Precision Production Tooling for more than Fifty Years*

## POTTER & JOHNSTON COMPANY

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

CIRCLE INFORM-A-GRAM KEY NO. 127

## DIAMOND MACHINE TOOL COMPANY
PICO, CALIFORNIA

Send us your catalog, "Profit From Presses" at once.
No cost. No obligation.

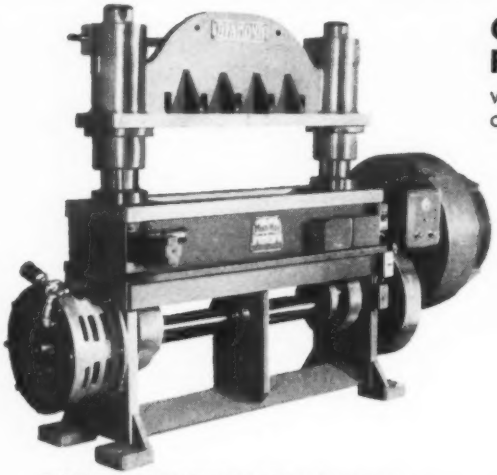
NAME.....

COMPANY.....

ADDRESS.....

CITY.....STATE.....

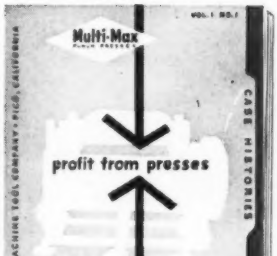
**PROFITS from PRESSES**



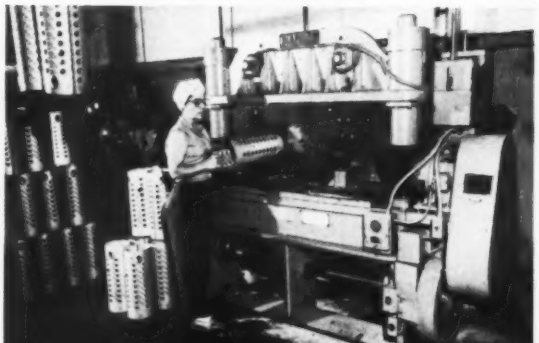
DIAMOND MULTI-MAX PUNCH PRESS
MODEL 5036 ILLUSTRATED

**OPEN THROAT PRESSES...**

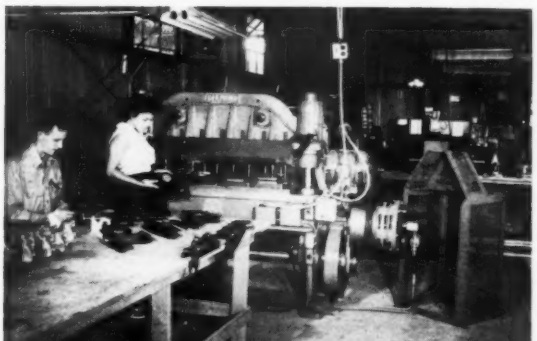
with long bed and ram areas illustrated in a new catalog, "Profit From Presses". Twenty pages with case history photographs such as illustrated below. Diamond Multi-Max punch presses are available in 30 and 50 tons capacity, 100 tons on special order. Six models for your selection. 24", 36", 48", 60", 72" and 84" working surfaces of bed and ram lengths. Air clutch and air brake at no extra cost. Mail in above coupon for your copy of this catalog, or write on your letterhead.




**SALES AND SERVICE IN ALL PRINCIPAL CITIES**



**SOLAR AIRCRAFT COMPANY, SAN DIEGO,** one of three Multi-Max presses used by Solar Aircraft Company in perforating parts of combustion chambers for jet engines. Large bed area required for two stage dies. Large shut die height required for insertion and removal of bulky combustion chambers.



**SAURENMAN COMPANY, INC., EL MONTE,** assembling and riveting Saxton Kant-Twist clamps on a Multi-Max press. Large press bed area is required for the permanent installation of nine dies for riveting nine different size clamps from one inch opening to twelve inch opening. Advantage of this permanent multiple die set up is in riveting various size clamps.

DIAMOND MACHINE TOOL CO.
PICO, CALIFORNIA

CIRCLE INFORM-A-GRAM KEY NO. 128

## MANAGEMENT GETS 'SPRING TRAINING'

A series of training programs on industrial programming, sales analysis, and allied fields is to be given during the next few months by Executive Services, management consultants of Cleveland, according to Nyles V. Reinfeld, Director.

The consulting firm is the first in its field to offer such an extensive training program, covering the problems encountered in every type of business, large or small.

The seminars to be conducted are all one week courses, with the exception of mathematical programming, which is a two week course. Courses are held in Executive Services' training room at the Alcazar Hotel on Cleveland's East Side. Seminar schedule for the spring months is as follows:

Operations Research, Mar. 5-9; Methods Improvement, Mar. 12-16; Production Control and Inventory Management, Mar. 19-23; Statistical Quality Control, Apr. 9-13; Market and Sales Forecasting, Apr. 16-20; Paper Work and Systems Engineering, Apr. 23-27; Work Measurement, Apr. 30-May 4; Management Organization, May 7-11; Mathematical Programming, May 14-25; and Standard Data, June 4-8.

## ERRATA . . .

A short news item in the January issue of TOOLING & PRODUCTION reported the successful application of cemented carbide to the facing of valve lifters at Mack Trucks, Inc. The news item incorrectly attributed to Carboloy engineers the development of the brazing technique used. T & P's editors regret this error, which resulted from a misinterpretation of the original information. It was engineers of Mack Trucks, Inc., not Carboloy, who developed the brazing technique that finally made the application successful.

Two illustrations were accidentally transposed in our December issue. In the article by Antoni Niedzwiedzki on "Friction in the Processing of Metals," the graphs identified as Figure 7B and Figure 8 should be exchanged in order for each to appear with its correct caption.

The Inform-A-Gram Card Page 142.1 is for Your Convenience in Making Inquiries.

**Now! Closer gage block tolerances give you up to 75% longer wear life at no increase in price!**

Ellstrom Standards are now produced and unconditionally guaranteed to specified millionths well within the following improved gage block tolerances:

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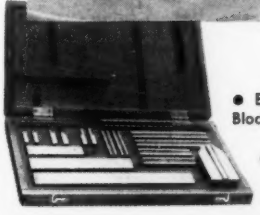
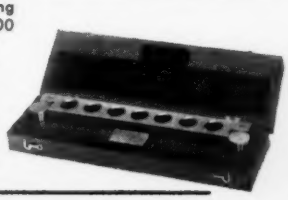
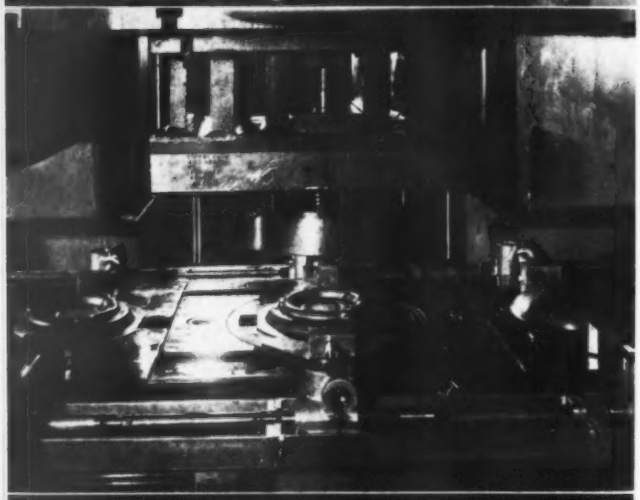


- Ellstrom Internal Setting Gage—12" range: $185.00
- Ellstrom Rectangular Gage Block Accessory Set: $288.95
- Ellstrom Master Sine Bar "W" Accuracy: $112.50 "I" Accuracy: $152.75



CIRCLE INFORM-A-GRAM KEY NO. 129



. . . Press line from page 112

**Top photo shows Sta. 3, where cupping takes place. In Sta. 2 to the right, in the same photo, the position stop arm and double-blank limit switch can be seen. The second photo shows Sta. 8 in the second press, where the reverse forming operation is performed. The next photo shows Sta. 13 in the third press, where the edges are cupped and bolt holes are pierced. The bottom photo shows Sta. 18 in the fourth press. Stampings have been inverted, and here holes are sized and bosses are undercut. The unloading chute, Sta. 19, can be seen at left.**

where it may be removed and replaced with another full one.

A push bar, operated by a hydraulic cylinder timed with the transfer feed, slides the blank from the bottom of the stack to a positive stop at Station 2. Physical clearance is only enough to permit just one blank at a time to be advanced from the stack. For additional protection, a limit switch at Station 2 tests for blank thickness and shuts down the equipment in the event of a double blank.

From this point on, transfer feed fingers move the workpiece from station to station.

Station 3 is the cupping operation in the first press. Stations 4, 5, 6 and 7 are idle. Station 8 is the reverse forming operation and takes place in the second press. Station 9 is idle. Station 10 is equipped with a flip-over device for possible future use. Stations 11 and 12 are idle. Station 13 is the edge cupping and piercing operation. Station 14 is idle. At Station 15 the stamping is turned over. Stations 16 and 17 are idle. At Station 18 the bore is sized and bosses are undercut. At Station 19 the finished stamping is dropped into an unloading chute.

The transfer feed consists of a series of fingers that move inward from front and back to clamp the stampings and carry them from right to left, each stamping being indexed 24″ to the next station. Fingers then retract, releasing the workpieces, and return to the right to "home" positions. Except at the flip-over station, stampings are slid along a runway which is flush with the lower die surfaces. This flat handling facilitates accurate, safe control of the workpieces.

Each of the three 600-ton backup presses has its own hydraulic power unit and its own sectionized feeding mechanism. When die change is required, the section of feed bar in front of the die area can be removed to facilitate the change. However, in the present setup, dies can be moved into or out of the presses without removing the feed bar.

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# *Precision Holes Drilled from the Solid at High Feed*

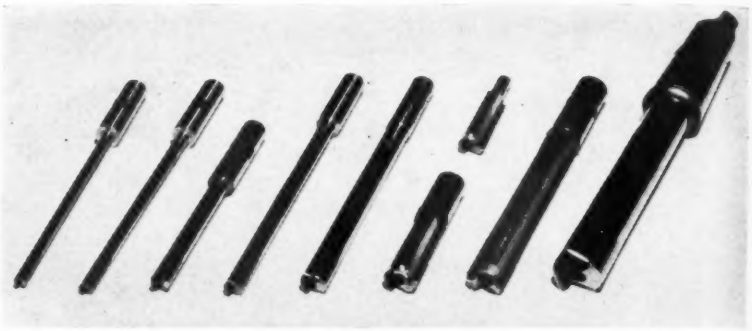

**Fig. 1. A variety of Starbore drills for producing precision holes in cast iron, bronze, aluminum and steel parts.**

A revolutionary new type carbide-tipped drill that produces smooth precision through-holes from the solid at feeds up to 60 ipm in cast iron, aluminum, bronze and steel parts has been developed by the Star Cutter Company. Hole tolerances of 0.0002" and surface finishes as smooth as 4 rms can be produced by the tool at feeds of 15 ipm.

The new Starbore drill (Fig. 1) is an efficient, long life tool that has a hollow circular molded carbide tip brazed to a tubular steel shank. Coolant directed under pressure through the drill to the cutting edges flushes out chips through flutes along the shank. The hole through the drill is off center to permit one of the two or more balanced carbide cutting edges to produce a small pin during the cutting process (Fig. 2), thus providing a tool with the combined advantages of an oil-flute or gun drill, and a trepanning tool.

Extensive use of the Starbore drill is expected where a single operation will produce a precision hole at more than four times conventional drill feeds and avoid subsequent semi-finish drilling, reaming and precision boring operations. The tool has proven to be an excellent gun drill and has produced holes in cast iron 20" long and 9/16" dia in 45 sec. Where a drilled hole of conventional finish is desired, the new drill will produce the hole at up to 20 times conventional drill feeds.

The Starbore drill can be used on conventional machine tools having spindle speeds that provide 200 to 500 sfpm and equipped with a high pressure coolant system. The tool is designed to operate through a bushing in contact with the work. A modified drill can be used successfully in conjunction with a bushing to enlarge previously drilled holes.

Tests using thrust meters in the Star Cutter Company's experimental laboratory have revealed that the new drills operate at approximately 1/3 the thrust load of a conventional twist drill operating at conventional speeds and feeds. In actual production runs, 4,650" of cast iron have been drilled at 10-ipm feed without sharpening the drill. At the end of the run, parts were being produced within 0.0002" tolerance. The Carboloy machinability computer has been used extensively in developing the tool.

Starbore drills are available in a wide variety of sizes and types to customer specifications. They have a shank of varying length made from SAE 4130 steel tubing. About ½" of carbide tip life is provided in the standard design. Two or more flutes can be provided in the drill as desired; the two-flute design being standard. Conventional carbide grades are used.

A surface grinder can be used in conjunction with a simple fixture to sharpen these drills. Two grinding wheels — an OD wheel and a cupped wheel — are required for the sharpening operation.

**PRODUCTION CASE HISTORIES**

| | Cast Iron Valve Hsg. | SAE 1213 Steel Bush. | Alum. Bush. | Bronze Pump Cyl. Block |
|---|---|---|---|---|
| Hole Dia | 0.499" | 0.678" | 0.500" | 0.475" |
| Hole Length | 6" | 2½" | 2" | 1-7/16" |
| Drilling Time | 36 sec. | 12.5 sec. | 6 sec. | 6 sec. |
| Hole Toler. | 0.0005" | 0.001" | 0.0005" | 0.0002" |
| Surf. Finish | 25 rms | 20 rms | 8 rms | 16 rms |
| Feed | 10 ipm | 12 ipm | 20 ipm | 15 ipm |
| Speed | 3,000 rpm | 3,000 rpm | 4,500 rpm | 3,500 rpm |

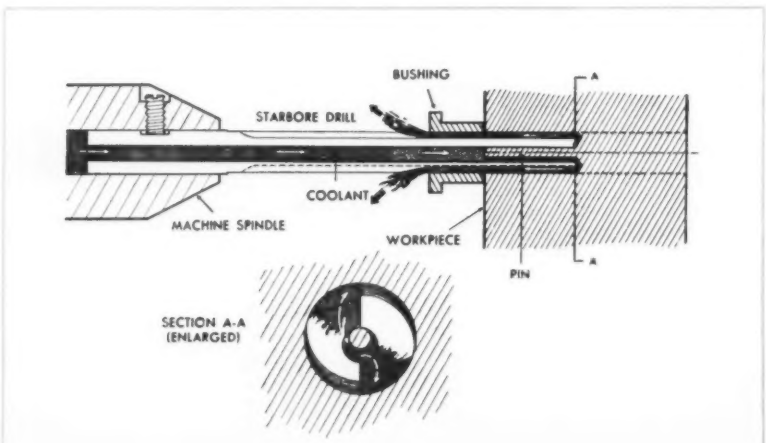


**Fig. 2. Coolant, directed under pressure to the cutting edges through the off-center hole, flushes out chips through flutes along the shank.**

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Available in Oil Hardening and Air Hardening (5% Chrome) types in a wide range of standard lengths, widths, thicknesses.

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CIRCLE INFORM-A-GRAM KEY NO. 133

# Size Correction After Hardening Eliminated by Using Right Steel

*by Edw. H. Markham*
Vice President
BROWN & MARKHAM MFG. CO., INC.
Louisville, Kentucky

ONE OF THE MOST COMMON and costly toolroom headaches is caused by tool and die steels that, because of excessive movement in hardening, have to be fitted and adjusted to size after heat treating.

When working limits are very close and the toolmaking investment high, the problem becomes more acute from the standpoint of both cost and tool or die performance. Such was the case encountered in our plant.

By adopting the right die material, we were able to solve an unusually tough problem in the making of dies (Fig. 1) to trim aluminum foil containers (Fig. 2) for the food packaging industry. The dies, used in a punch press, were first built in sections from an oil-hardening die steel. These worked fairly well, but did not measure up to the special requirements on the job.

The toolroom was instructed to make the dies (1) all in one piece and in such a way that they would (2) provide skin-fit mating and (3) require no finish grinding after heat treating. These specifications demanded something quite unusual in hardening behavior. So, our next step was to try Carpenter Vega, an air-tough die steel especially developed to resist deformation and size change in hardening.

Using Vega, a specialty brand of The Carpenter Steel Company, Reading, Pa., the toolroom finish-machined the tools to actual size before heat treatment. They were stress relieved at 1250°F and then furnace cooled. After this, they were given a normal heat treatment at 1550°F, air cooled, and drawn for 4 hrs at 350°F. This procedure gave a final hardness of about Rockwell 60-C.

*. . . Continued on Page 136*

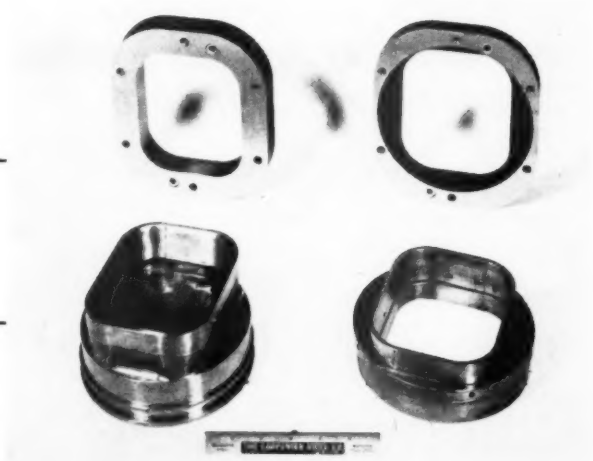

**Fig. 1. Die sections (below) and draw rings (above) made to trim aluminum foil pans used in food packaging.**

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**AUTOMATIC TRACER-CONTROLLED MILLING MACHINE . . .** cuts another BIG job down to size. The R. H. Freitag Mfg. Co. of Akron, Ohio provided the Molded Fiber Glass Body Co., Ashtabula, Ohio with molds to be used in producing about 300 fifteen-foot fiberglass motorboat hulls a month. The male mold was duplicated from a wood model and the female from a fiberglass model, on Freitag's 16′ x 7′ Keller BG-22 Machine.

Standard-size Type BG-22 Keller Machines have work size capacities of 10′ x 5′, 12′ x 6′ and 14′ x 7′. Machines with special combinations of travels required to do specific jobs can be built on order.

Whatever the size — big or small — or shape — simple or complex — of the plastic parts you want, a Keller Machine can provide the capacity and ability to produce accurately, quickly, economically the dies and molds you need.

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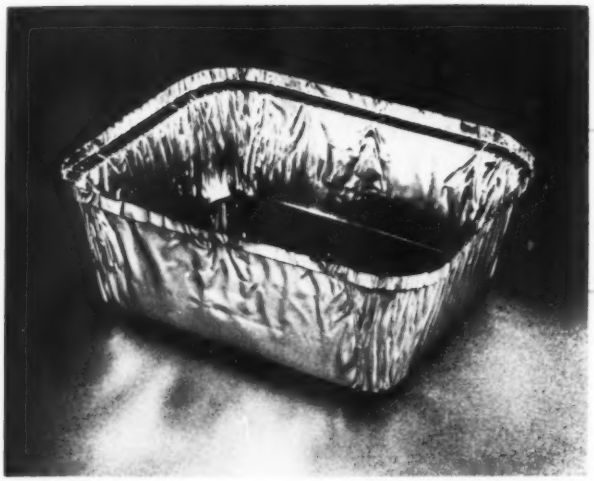

Fig. 2. The finished aluminum foil container, trimmed and formed in one operation.

. . . Size Correction from page 134

When the toolmaker compared measurements before and after hardening, it was found that the 2 die sections and 2 draw rings held to .0003″/.0004″ overall . . . not just per inch. No finish grinding was required at any time during or following heat treatment.

A perfect "skin fit" remained just as it was before heat treating. The die sections, furthermore, had been completely machined from one solid bar of die steel. There was no need for bolting sections together.

Machinability was no problem, though a good bit of machining was involved. Our toolroom reported that Vega "machined as well as, if not better than, any other tool steel" with which they had past experience.

Almost staggering production is expected from the tools. The two rings are expected to shear 26 million pieces before any grinding or modifications. The two other sections and the balance of the die (not photographed) are expected to form 250 million of the .003″-thick containers.

The Vega die steel used in the application is an unusual grade that combines the deep hardening characteristics of air-hardening steels with the simplicity of low temperature heat treatment possible in many oil-hardening steels.

Non-deforming properties of the steel are shown by the curve in Figure 3. It can be seen that the minimum size change occurs at a drawing temperature of 300° to 400°F. A piece 1″ long will expand about .0005″ when hardened, but when drawn at 400°F, will return to within .0003″ of its original length.

Due to its relatively low hardening temperature, the steel has very little tendency to decarburize. And, since it contains relatively small percentages of the hard-to-machine alloys, it is one of the easiest air-hardening steels to machine.

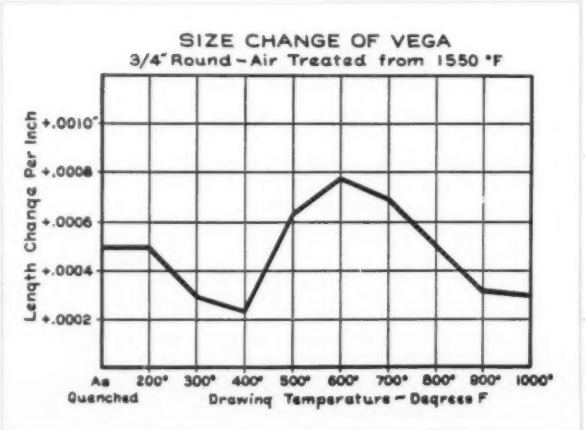


Fig. 3. Curve showing minimum size change of Carpenter Vega after heat treatment.

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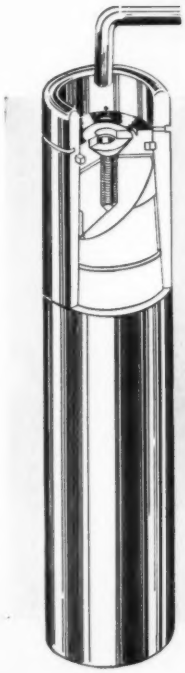
protect fingers by providing roomy gripping space on either side of die shoe.



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end troublesome binding in die set assembly work . . . Hexagon key removes caps to free punch holder . . . Dies part quickly and easily.
Instead of needing 2 or 3 die makers to remove the punch holder from a set, one man can easily do this work alone in a few minutes.
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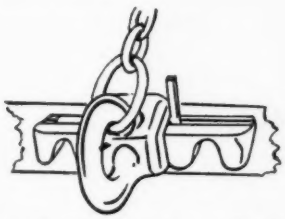

Permits lifting of small and large sets . . . die set can be turned over without clamping . . . Positive safety . . . Self locking . . . Simple, easy to use.

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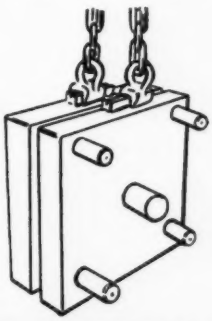

Male jaws attached to the sling fit quickly into the safety flanges for immediate lifting . . . No need for "C" clamps, eye bolts, or lifting lugs.

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CIRCLE INFORM-A-GRAM KEY NO. 137

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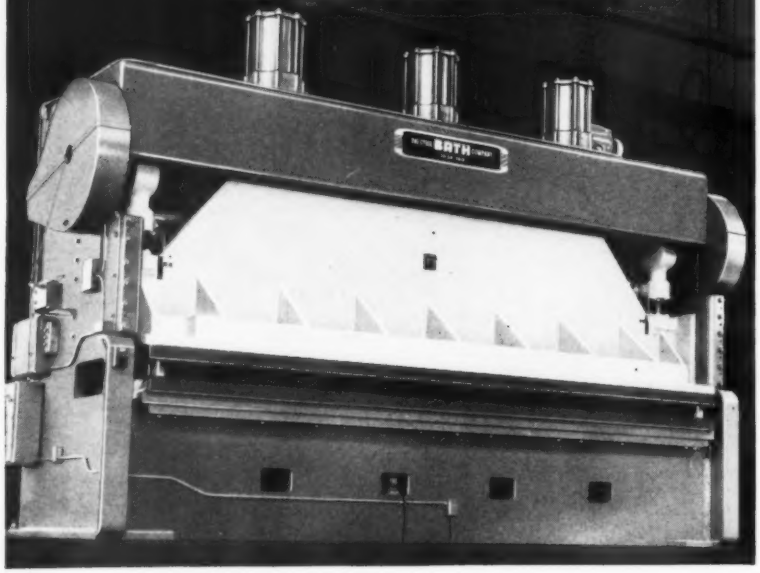

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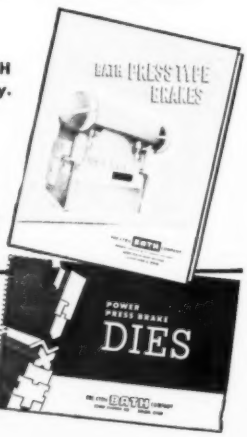


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CIRCLE INFORM-A-GRAM KEY NO. 138


## TOOL SHOW PREVIEWS

- Models Super 60 and Super 80 power quills will be displayed in operation in Booth 296 by Precise Products Corp., Racine, Wis. The quills will produce surface finishes below 7 micro-in. and will remove stock as high as 0.012" per pass. Super 80 is shown mounted on a 10" and 16" precision lathe. (S56)

- An Idea-Rama—designed to give visitors a fresh approach to lowering tool and die costs, improving their products, and increasing productivity — is to be staged by Carpenter Steel Co., Reading, Pa., at Booth 1310. Highlights include the first showing of an improved die steel, H-9 Double Header die steel; first news of an improved manganese oil-hardening die steel; and the premier showing of a 28-min. color slidefilm, "Four Steps to Better Tools and Dies." (S57)

- No calculations are required to calibrate surface plates to optical instrument precision with the new device to be shown by Rahn Granite Surface Plate Co., Dayton, Ohio, at Booth 928. With it the entire operation consists of merely taking indicator readings under an adjustably mounted straight edge. The mounting assures that the device is supported in the exact reference plane. Precision is limited only by the precision of the indicator used. (S58)

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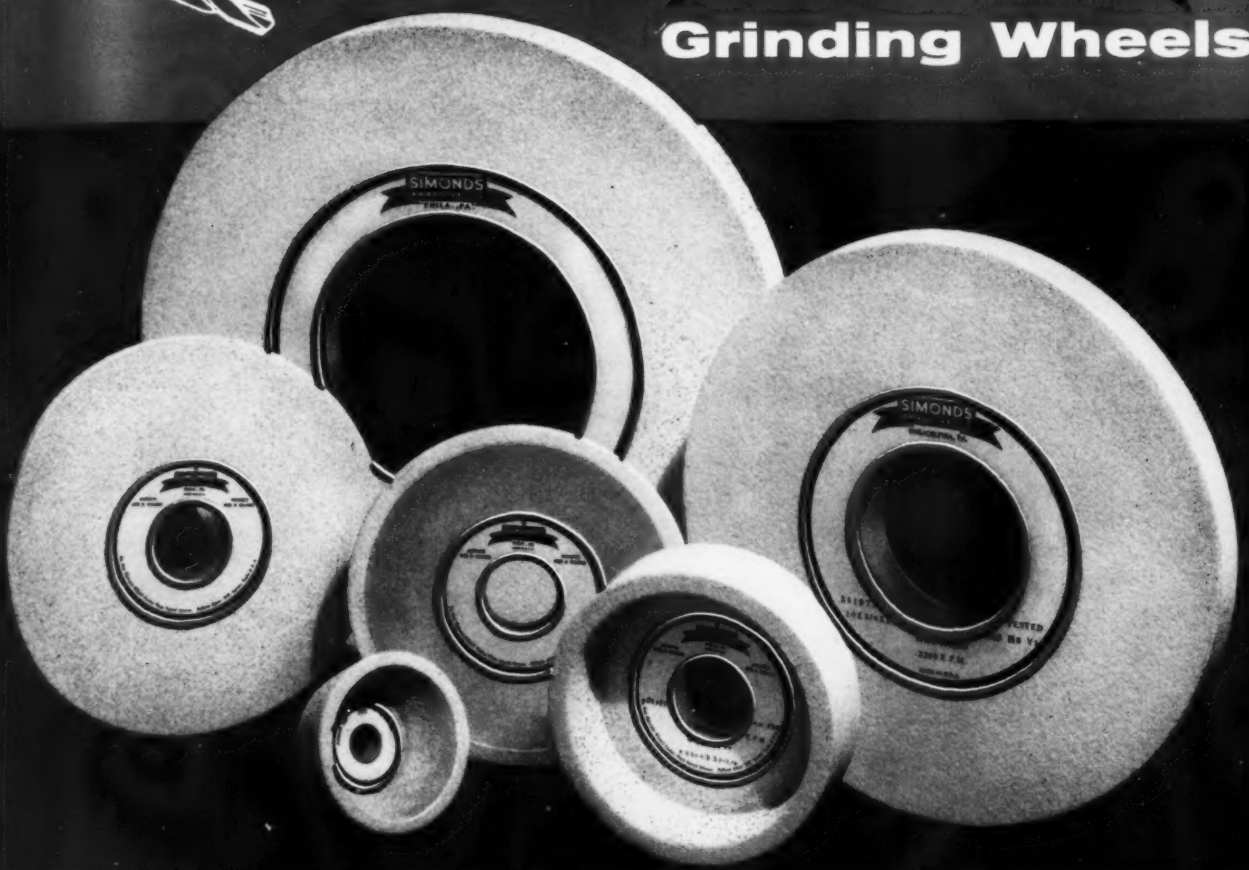


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For hardened and high speed steels, high carbon, high chrome and other alloys. For fast, cool cutting action with long wheel life, these wheels belong on *your* toolroom grinders. Made with W Borolon (special aluminum oxide abrasive) for fast stock removal and the finish you want without burning expensive steels. Engineered for true concentricity and good balance. Furnished in protective cellophane bags. For consistently superior results, standardize on Simonds W Borolon White Wheels.

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# PLASTIC-CLAD METAL

## Lightens H-D Hydraulic Pistons

TO STAND UP UNDER THOUSANDS of tremendous landing blows, the pistons used in AEROL shock-absorbing units for aircraft landing gears must be mechanically strong, shock resistant, impervious to oils, and indifferent to sharp temperature changes. More important, however, metal-to-metal contact between piston and cylinder must be avoided to prevent the piston "seizing" inside the cylinder due to the effects of weather or hydraulic oil on the metals.

Laminated plastics joined forces with aluminum to solve this problem and to produce, in effect, a new, lighter industrial material. Synthane Corporation developed the process to suit designs produced by the Cleveland Pneumatic Tool Company.

Fig. 1

The aluminum cylinders from which the pistons are made are first knurled (Fig. 1) to produce a roughened surface which provides the necessary anchor for bonding the laminate outer covering firmly to the metal.

As the specially treated fabric covering passes over heated pressure rollers (Fig. 2) to be wrapped around the aluminum tube, the resin in it softens and the chemical process of polymerization takes place. This fuses the individual layers into a strong, solid mass that cannot be resoftened or reshaped. When the fabric is built up to a point slightly beyond the required wall thickness, the tube is oven-cured to complete polymerization.

The laminate wrapper is then machined (Fig. 3) to the proper outside dimension. After

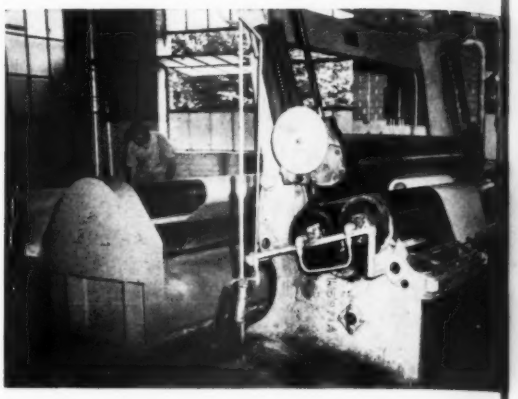


Fig. 2

that, the tube is cut to the specified lengths for the pistons.

Synthane performs more than a dozen machining operations on the laminate-aluminum

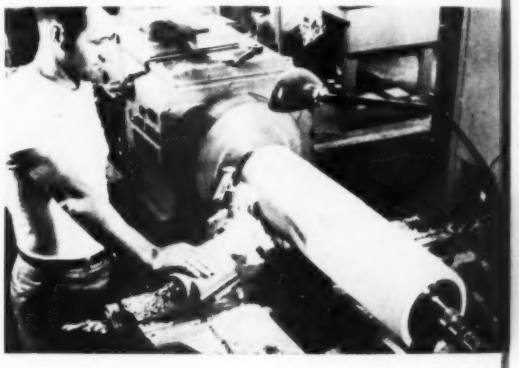


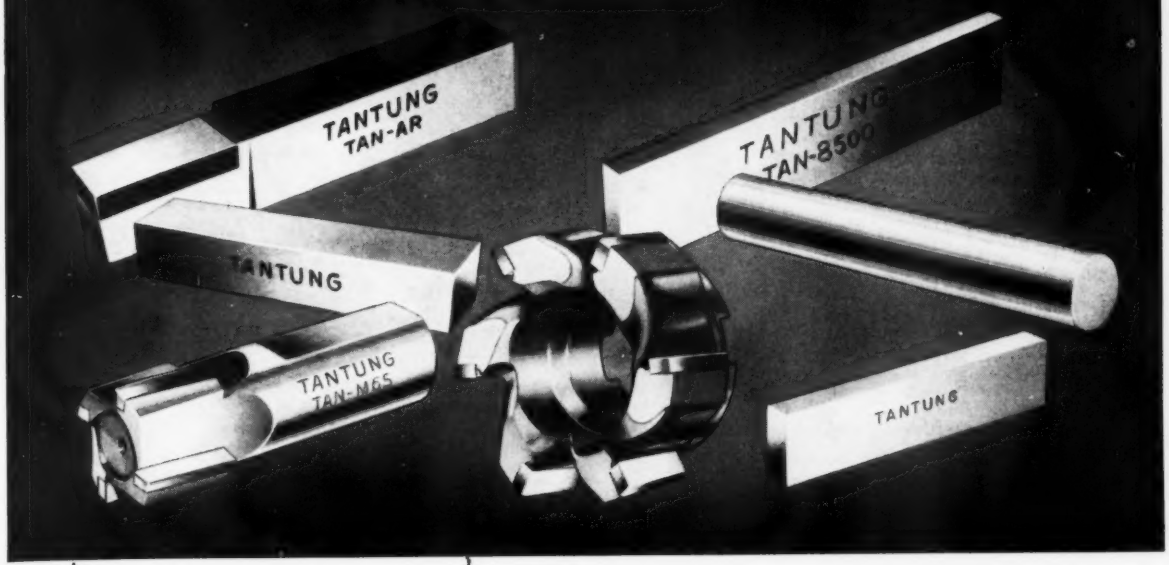
Fig. 3

combination to produce each piston head. Sections are turned, bored, threaded, undercut, chamfered, milled, drilled, and stamped with a part number. In Figure 4, the internal diameter is being turned.

Fig. 4

# V-R TANTUNG CAST ALLOY

## cuts twice as fast as High Speed Steel




### Facts You Should Know About TANTUNG, V-R's *Exclusive* Cast Alloy:

- **TANTUNG CONTAINS CARBIDES**—of tungsten, tantalum and columbium. This combination gives it superior toughness and lower friction coefficient than ordinary cast alloys.
- **TANTUNG IS STRONGER**—transverse rupture strength double of most cast alloys.
- **TANTUNG HAS HIGH RED-HARDNESS**—it maintains cutting hardness at red heat temperatures well above that of high speed steel.
- **TANTUNG IS EASY TO GRIND**—aluminum oxide wheels used for hardened steel are suitable.
- **TANTUNG IS AVAILABLE PREFORMED**—when you buy preformed tools, you save grinding costs and get better cutting quality and longer tool life.

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### High Red-Hardness — Plus Low Friction

***lets you speed up your machines and cut your costs . . .***

As a general rule, when using TANTUNG cast alloy cutting tools, you start your machines at about twice the speed you would use with high speed steel tools. TANTUNG bridges the gap between the maximum speeds possible with high speed steel and the minimum speeds practical with cemented carbides. Its general cutting range lies between 80 and 180 surface feet per minute, subject to some variation according to machining operation and material being cut.

And, TANTUNG is at its best under heavy feeds!

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JOB: Recessing high alloy steel ring gear forging on Potter and Johnson Semi-Automatic.

| | H.S.S. | TANTUNG |
|---|---|---|
| Speed: | 94 R.P.M. | 165 R.P.M. |
| Feed: | .004" | .008" |
| Depth of cut: | .125" | .125" |
| Pieces per grind: | 35 | 70 |
| Av. pieces per shift: | 38 | 100 |

*. . . more than 2½ times production increase!*

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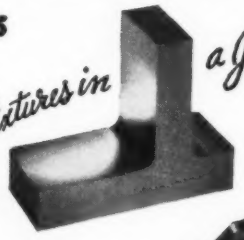

Our "T" Angle Plates have many applications as milling fixtures, comparator stands or drill jigs. The addition of a few special parts make this a complete fixture at little cost. Normalized and precision machine castings. Full scale sheets of 7 standard sizes will be included with your catalog if requested.

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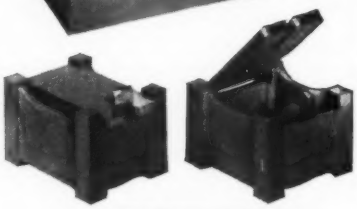

Box Jigs shown are made in either square or rectangular style in 9 sizes. Have them on hand in several sizes, use them, and watch your profits mount.

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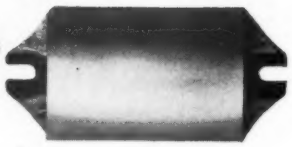
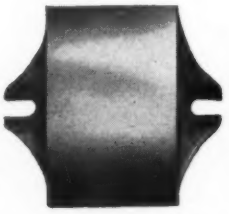


The Mill Fixture Base shown on top is available in four sizes, the Gang Mill Fixture Base in three. Both are furnished with either standard keyways or jig-bored holes for "Sure-Lock" Fixture Keys at no extra cost. These normalized bases are precision ground, parallel top and bottom with one side finished parallel to the keyways, eliminating the delay and expense necessary in obtaining patterns, castings, normalizing and machining. Ask for full scale template drawings in your size range.

Sure Lock Fixture Keys See Page 41 of our Template Catalog



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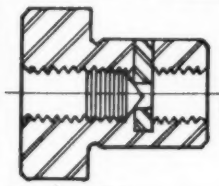

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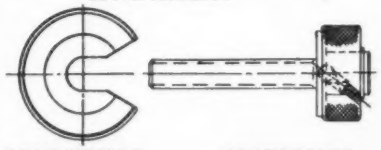

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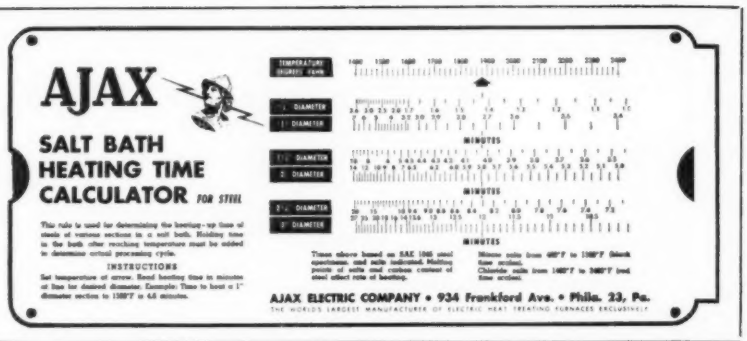
**This Salt Bath Heating Time Calculator** is used for determining the heating-up time of steels of various sections in a salt bath. It gives the heating time, in minutes, for steel sections from ½" dia through 3" dia. On the reverse side is a temperature conversion table. Also given is a table of hardness conversion numbers. Ajax Electric Co., 934 Frankford Ave., Philadelphia 23, will provide copies of the calculator, or — **Circle Inform-A-Gram No. C1.**




**This Tube Weight Computer** quickly figures the weight of steel tubing. Set the movable arm pointer at tube wall thickness and O.D. and read off the tube weight/ft in pounds. On

the reverse side are weight tables for round steel bars. The Tube Weight Computer may be obtained from The Timken Roller Bearing Co., Canton 6, O., or—**Circle No. C2.**

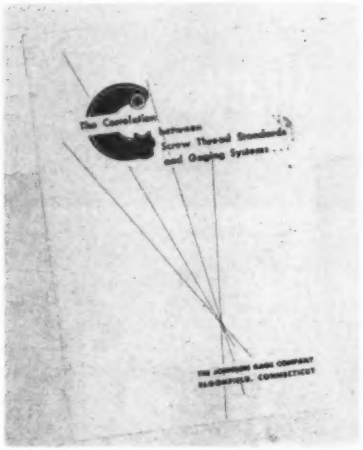
**Manufacturing and Fabricating Techniques** for CF&I "Lectro-Clad" nickel plated steel, including cleaning, handling, welding, and testing methods, are covered in a new manual from The Colorado Fuel and Iron Corp., P.O. Box 1951, Wilmington, Del. Also presented is a technical description of this steel. The recommended fabrication and forming methods include die forming, layouts and assemblies, fit-ups, rolling, shearing, cold forming, and storage.
**Circle Inform-A-Gram No. C3.**

**"Measurement of Vibration"** contains the meaning of vibration terms, a description of vibration-measuring instruments, procedures, typical examples, and an interpretation of results. A short section is devoted to the human response to mechanical vibration. It will serve as a useful guide in understanding what is happening in cases of desirable and undesirable industrial vibration. Copies are available from General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass., or —
**Circle Inform-A-Gram No. C4.**

**"11 Ways To Save Drafting Time"** discusses 11 specific ways of using intermediates to make quick modifications of drawings without changing the original. Each technique is clearly illustrated. Among the topics covered are masking, pre-printing, composite grouping, and the blockout method. Copies are issued by the Reader Service Div'n, Frederick Post Co., 3666 N. Avondale Ave., Chicago 18, or —
**Circle Inform-A-Gram No. C5.**

**"Developments in High-Powered Surface Grinding"** is a progress report pointing out the significance of high-powered precision surface grinding. This report also covers the special effects these developments have on production, accuracy, finish, and the work range of grinders. The statement is made that improved wheel bonds make grinding a versatile high-production method—the last step in accuracy. Copies of the bulletin are issued by Mattison Machine Works, Rockford, Ill., or —
**Circle Inform-A-Gram No. C6.**

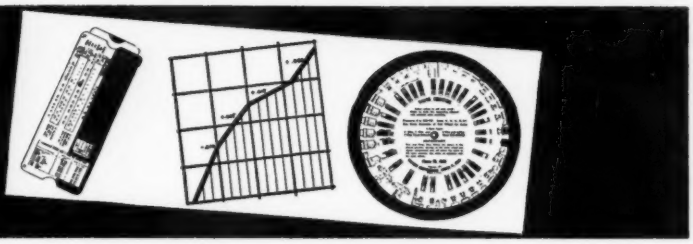
**"The Correlation Between Screw Thread Standards and Gaging Systems".** This pamphlet presents an authoritative approach to the controversy between proponents of "effective" and "actual" checking of minimum-metal on screws and




tapped holes. Pertinent facts are given and discussed in detail and a number of points which sum up the discussion are listed. Get your copy of Pamphlet J-55 from The Johnson Gage Co., 534 Cottage Grove Rd., Bloomfield, Conn., or—**Circle No. C7.**

**"Haynes Stellite Metal-Cutting Tools".** The purpose of this booklet is to give tool designers, engineers, machinists, and metallurgists data that will serve as a useful guide in the selection of tool materials. Haynes Stellite Co., Div'n of Union Carbide and Carbon Corp., P.O. Box 746, 725 S. Lindsay St., Kokomo, Ind., will provide copies, or —
**Circle Inform-A-Gram No. C8.**

# AIDS



**The Benefits of Collecting Diamond Swarf** from diamond wheel carbide grinding operations and from salvaging worn out diamond wheel stubs are described in a new booklet. Included is such informa-

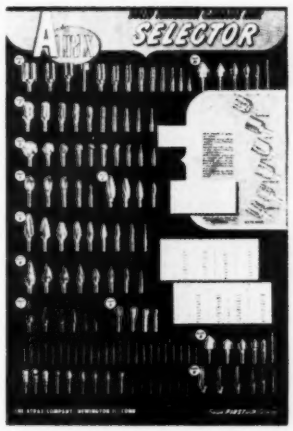
tion as where swarf can be sent for reclamation and the value of diamonds salvaged. Get your copy of the booklet, "Collecting Carbide Diamond Swarf", from Norton Co., Worcester 6, Mass., or— **No. C9.**

**A Tool Steel Selector** covers nondeforming, water hardening, shock resistant, hot work, and high speed tool steels. It gives general and heat treating data. Another chart on the back page shows the grades of hollow die steels carried in stock. A. Milne & Co., 741-3-5 Washington St., New York 14, will supply copies of the selector, or— **Circle No. C10.**

**The Carb-A-Grade Selector** is a pocket-sized guide featuring tables for the selection of steel cutting grades and grades for cutting cast iron and non-ferrous materials. Also on the selector are a decimal equivalents table and a diagram showing the relation of feed to speed. It is designed so that the user can determine what grade of carbide he must change to in order to relieve certain undesirable effects obtained because he is using an incorrect carbide grade. For copies of the selector which measures 3½" x 6", write to Dept. H-45, Adamas Carbide Corp., Kenilworth, N. J., or—**No. C11.**

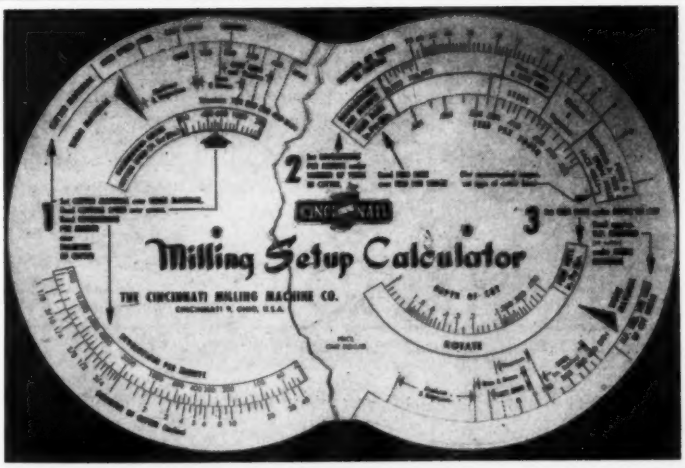
**"G-E Shell Molding Manual"** provides foundrymen and casting users with an up-to-date, practical handbook for the production of shell molds and castings. The manual discusses in detail, complete with photos, the fundamental steps of shell molding. It also points out and discusses the advantages of shell molding. A chart gives a comparison of shell molding and other casting processes. One section is devoted to production data and another to application studies. Also presented are methods and procedures for shell mold and G-E shell resin testing. In addition, G-E foundry materials are listed and explained. Copies of Manual CDC-272-A are made available by P. F. Gavaghan, General Electric Co., Pittsfield, Mass., or—**Circle No. C12.**

**This Wall Chart** contains operating information and illustrations of more than 120 standard solid tungsten carbide burs. The chart features an easily read Recommended Speed Table which prescribes the correct bur and rpm for most efficient work on any material from stainless steel to aluminum. Atrax




burs will file and finish plastics to hardened steels. The complete line of standard Atrax burs are shown in actual size with specifications and tool numbers to facilitate ordering. Contact The Atrax Co., Newington 11, Conn., for copies of the legible wall chart that resists the dirt and grease of hard shop use, or — **Circle Inform-A-Gram No. C13.**

**This Milling Calculator** is designed for selecting optimum speeds and feeds and determining economic cutting speed. The side of the calculator shown is designated Milling Setup. It is used to quickly determine spindle speeds and feed rates which are adequate for toolroom operations, job lot milling, or short production runs. On the other side, entitled Economic Cutting Speed, a modified cutting speed can be determined which will give the minimum cost per piece for high production milling jobs. The Cincinnati Milling Machine Co., Cincinnati 9, O., will fill requests for the durable plastic calculator priced at $1.00.



**For Ease and Convenience Use TOOLING and PRODUCTION Inform-A-Gram Cards**

**Solid Tungsten Carbide Tools** and high speed rotary files are included in Catalog TC-HS from Jarvis Corp., Middletown, Conn. End mills, special mills, reamers, solid carbide drills, and boring tools are among the tools described and illustrated. In addition, the company's line of rotary files is presented in detail. **Circle Inform-A-Gram No. B1.**

**The "Inside" Story On "Spacemaker" Cylinders** is told in Bulletin SM-155-2 from The Tomkins-Johnson Co., Jackson, Mich. Cut-away photos show the features of the air and oil cylinders and their construction. Also given are mounting dimensions and diagrams of various types of mountings. **Circle Inform-A-Gram No. B2.**


**There's never a "leave-off" mark . . .**

Over-all capacities:
Model 22-23S —
¼" to 1" ANPT
Model 24-25S —
1" to 2" ANPT

**. . . with the new J & L Taper Receding Die Head**

Now you can cut precision taper pipe, *dry seal*, and other taper threads to all standard specifications — *without chaser "leave-off" marks.*

J & L's new Taper Receding Die Head is *full* receding. Only the chamfered teeth and the first full tooth in the chaser set do the cutting. Pressures on the chasers are much less than those resulting from "form" or "jam" cuts. And cutting action is the same as that of straight threading. You get smoother threads — no "leave-off" lines — longer chaser life.

These new Taper Receding Die Heads also feature simple, controlled set-up and automatic operation. *Write for form #5430.*

JONES & LAMSON

*Class III Guaranteed Not Sometimes, but Everytime!*

JONES & LAMSON MACHINE CO., 519 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L THREAD TOOL DIV.

CIRCLE INFORM-A-GRAM KEY NO. 146


**Properties and Applications** of a wide variety of adhesives, coatings, and sealers are listed in an illustrated catalog. Comprehensive tables give typical applications and then present specific examples, characteristics, method of application, color, base, solvent, solids content, net weight, and company formula identification. General information on materials, techniques, services, and selection is also included. Adhesives and Coatings Div'n, Minnesota Mining & Mfg. Co., 411 Piquette Ave., Detroit 2, or **—Circle Inform-A-Gram No. B3.**

**A Torque Wrench Tester** is highlighted in a brochure from P. A. Sturtevant Co., Addison, Ill. The 1954 Ott torque tester is available in 3 capacity ranges. The screen has 6 horizontal scales, each a continuation of the other to the full capacity of the particular tester model. The loading arm with adjustable length may be put in 4 different positions with a locking pin. **Circle Inform-A-Gram No. B4.**

**Extrusion Presses** for ferrous and non-ferrous metals; and injection, compression, and transfer molding machines for the plastics industry are found in a 24-page bulletin. Also included are metalworking equipment and standard and special machinery for general industrial applications. Copies of General Bulletin 110-D may be obtained from Watson-Stillman Press Div'n, Farrel Birmingham Co., Inc., Aldene Rd., Roselle, N. J., or—**Circle No. B5.**

**A Portable Spray Painter** is illustrated and described in Brochure 602 from Conforming Matrix Corp., 416 Factories Bldg., Toledo 2. Model SS2G automatic air-motivated decorating machine is used for short or long runs which can be placed in standard exhaust type spray booths. Many different sizes and shapes of parts can be sprayed by rotation, insuring uniformity of coating. **Circle Inform-A-Gram No. B6.**

**Higher Accuracy, Greater Range, and Maximum Speed** in grinding perforators are features of the Harig Grind-All fixture. The fixture permits grinding a wide variety of irregular shapes concentric with shank within ±0.0002". For further information on the fixture, contact Harig Mfg. Corp., 5751 W. Howard St., Chicago 31, or — **Circle Inform-A-Gram No. B7.**

Circle postage-free Inform-A-Gram Key Number for more information

## TOOLING and PRODUCTION'S Inform-A-Gram Section is a CARDload of Information

**A Precision Stamping Directory** listing companies generally regarded as experts in their field is now available from American Silver Co., Inc., 36-07 Prince St., Flushing 54, N. Y. The directory covers the New England, New York, New Jersey-Pennsylvania, and Chicago areas. Precision job stamping sources are identified as to the specialized services they can provide. The stamping firms listed are equipped to stamp parts from thin gauge metal strip, or very close tolerance metal strip or clad metals, and some also perform secondary operations.
**Circle Inform-A-Gram No. B8.**

**A New Principle** for sharpening small tools up to 3" dia is described in a 6-page folder. The "Centra-Point" method features mechanical wheel dressing, self-registering tooth rests, and direct reading of clearance angles. Illustrated Folder M-55 released by William H. Field Co., Inc., 325 Dorchester Ave., Boston 27, gives the details on the "Centra-Point" end mill grinder, or —**Circle Inform-A-Gram No. B9.**

**Control and Modulate 3000 Psi Hydraulic Pressure** with 15 watts electric power by using a new motorized hydraulic valve. A bulletin presents diagrams and valve and control box installation details. This Bulletin V-101 describing the valve can be obtained from United Hydraulics, Inc., 110 Terrel Ct., Dayton 7, O., or—**Circle No. B10.**

**The Applications of Infrared Energy** are covered in two bulletins. One details radiant rod oven sections and the other, quartz lamp oven sections. Both are designed for easy assembly into complete infrared ovens. The bulletins containing specifications, application data, and additional information on the equipment may be obtained from The Fostoria Pressed Steel Corp., Fostoria, O., or—**Circle No. B11.**

**Double Crank Inclinable Presses** are featured in Catalog 3 from E. W. Bliss Co., 1375 Raff Rd., S.W., Canton, O. Included is a newly-designed line of enclosed double cranks with box-type crowns. In addition, detailed descriptions of such features as air-friction and rolling key clutches, cast Meehanite frames, die cushions, and automatic feeds, are given.
**Circle Inform-A-Gram No. B12.**

**An Automatic Transveyor Fork Truck** is described in a new bulletin. Model ESRT20 has a telescopic retractable mast and 2000-lb capacity. Details on the truck, diagrams, photos, specifications, and a list of its features are found in a bulletin from Automatic Transportation Co., 149 W. 87th St., Chicago 90, or —
**Circle Inform-A-Gram No. B13.**

**Lifting Devices** are listed in Bulletin G114 published by H. L. Bushman Co., 100 W. Central Ave., Roselle, Ill. Each device is shown and described and its capacity given. Among the ones included are semi-automatic strip steel lifter, adjustable box grab, fork crane hook, and plate and sheet lifters.
**Circle Inform-A-Gram No. B14.**


NOW CUT COST OF PRECISION GEAR PRODUCTION

THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

CONTRIBUTES to more gear precision with no sacrifice of gear production,

OR INCREASED gear production with no sacrifice of gear precision, ..... OR BOTH!

Prices and specifications without obligation

ASK FOR FREE BULLETIN 5410
Address
The Hamilton Tool Company
832 South Ninth Street
Hamilton, Ohio

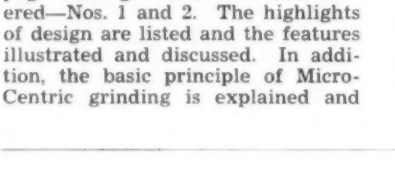
IT'S A Hamilton Tool
USE IT WITH CONFIDENCE

CIRCLE INFORM-A-GRAM KEY NO. 147

**A Complete Line** of standard carbide tipped counterbore cutters is offered by Eclipse Counterbore Co., 1600 Bonner Ave., Detroit 20. A bulletin from the company lists the sizes available and contains the necessary ordering information.
**Circle Inform-A-Gram No. B15.**

**Filmatic Micro-Centric Grinding Machines** are the subject of an 11-page catalog. Two sizes are covered—Nos. 1 and 2. The highlights of design are listed and the features illustrated and discussed. In addition, the basic principle of Micro-Centric grinding is explained and dimensional drawings and general specifications included. Catalog G-662 can be obtained from Cincinnati Grinders Inc., Cincinnati 9, or —
**Circle Inform-A-Gram No. B16.**

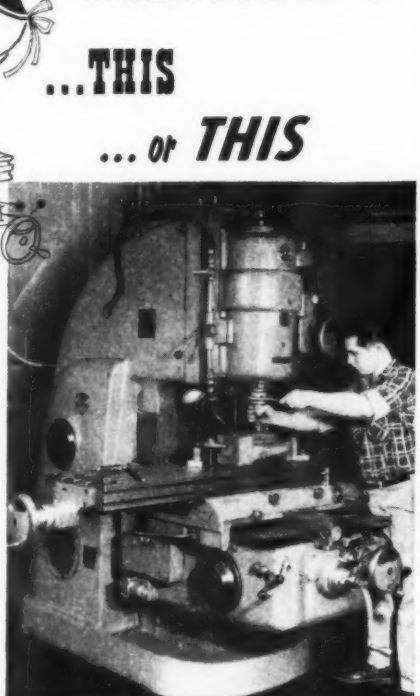
**Hydraulic Die Try-Out Presses** are used for development work, testing, short production runs, and as a shop tool. Dake presses feature complete control, smooth action, full power, and safety. Bulletin 330 giving details on the presses and their specifications is made available by Dake Corp., 634 — 7th St., Grand Haven, Mich., or —
**Circle Inform-A-Gram No. B17.**

HOW MODERN IS *YOUR* METHOD ?

...THIS

... or *THIS*



**The modern P.D.Q. tooling method completely eliminates the time lost in changing old fashioned type tools. No more "sweating out" loosening and tightening the draw bolt. A 60° turn of the lock nut and you're ready for another tool. P.D.Q. tool changes are only a matter of seconds . . . and tools are available in very small, small, medium and large series depending on the application. Write for literature covering all the advantages of modern, cost cutting P.D.Q. (Portage Double Quick) tooling.**

*BOOTH NO. 669 AT THE ASTE SHOW*
REPRESENTATIVES IN PRINCIPAL CITIES

**PORTAGE Double-Quick TOOL CO.**

1046 SWEITZER AVENUE • AKRON 11, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 148


**"Airtube On Target"** describes the several sizes of Airtube systems, and the central desk and the semi and automatic switch systems that are available. One section is devoted to detailing the variety of carriers that are offered along with outline diagrams of each type. Another section is made up of several case history reports of typical airtube installations in a cross section of industries. Copies of this catalog may be obtained by writing to Lamson Corp., Syracuse 1, or —
**Circle Inform-A-Gram No. B18.**

**Simplify Chuck Specifying and Buying** by using the redesigned Horton Catalog with a visual index to aid in locating the information. The catalog is divided into sections in which every chuck, jaw, and part is illustrated with photos and dimensional drawings. It includes data for independent, scroll universal, scroll combination, two-jaw lathe, and light duty chucks; and face plate and boring mill jaws. Get Catalog E-200 from Horton Chuck, Div'n of The E. Horton & Son Co., Windsor Locks, Conn., or —
**Circle Inform-A-Gram No. B19.**

**Metalworking Machines** are the subject of a new Famco general catalog. It includes data, specifications, photos, and descriptions of power, air, drill, and foot presses; band saws; and squaring shears. Also illustrated and discussed are the 4 clutch types available for the presses—pin, Electrol, Multi-Power, and Electromatic. Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis., or — **Inform-A-Gram No. B20.**

**Increase the Efficiency of Nutsetters** by using Fischer turned brass and aluminum nuts that are produced on specially-designed turning machines to insure maximum uniformity and precision. A new catalog describes and gives specifications for standard hexagon nuts, open- and closed-end cap nuts, and knurled thumb nuts which are tapped square with face to Class 2 tolerances. Details are in Catalog 55 from Fischer Special Mfg. Co., 483 Morgan St., Cincinnati 6, or — **Circle No. B21.**

**Cut Production Costs** with self-cooling automatic unit sisal and open-face sisal buffs. The self-cooling unit design circulates air throughout every fibre to keep the work cool even in high-speed operation. The open ruffle design directs cooling air currents over the work to permit faster speeds without heat discoloration. For further information on the buffs, get a bulletin from American Buff Co., 2414 S. La Salle St., Chicago 16, or —
**Circle Inform-A-Gram No. B22.**

**A Complete Line of High-Speed Automatic Presses** is described and illustrated in a Bliss catalog. The problems inherent in operating a press at speeds of up to 800 strokes/min are discussed. The catalog reveals how the company has designed the line of high-production presses to overcome these problems. E. W. Bliss Co., Canton, O., will supply copies of Catalog 27C, or — **Circle Inform-A-Gram No. B23.**

**The Operating Mechanism** of pull-type semi-automatic "One-Shot" lubricators, types HIB and JIB, is described in a 2-page instruction sheet. They're used on machines requiring closely controlled but infrequent oil feed. The component parts of the system and the 16 different types of Meter-Units available are pictured. Also covered are the lubricators' operation, maintenance, and detailed service information. For copies of the instruction sheet, write to "Service". Bijur Lubricating Corp., 151 W. Passaic St., Rochelle Park, N. J., or — **Circle Inform-A-Gram No. B24.**

**Carbide Tipped and Solid Carbide Tools** are featured in a Cleveland Twist Drill catalog. Among the tools covered are drills, reamers, end mills, and counterbores. Each tool is illustrated, described, and its recommended uses listed, complete with ordering information. The last section of the catalog contains technical information such as the use and care of carbide drills and reamers. Copies of "Cleveland Carbide Tools" may be obtained from The Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, or — **Circle Inform-A-Gram No. B25.**

**"Plunjet" Gaging Cartridges** are used for many gaging and machine control applications. Two major types are available — the normal and the reverse. Each has its individual advantages according to the application. For further details on the cartridges, their design, applications, and selection information, get an illustrated engineering data publication from The Sheffield Corp., Dayton 1, or — **Circle Inform-A-Gram No. B26.**

**An Automatic Valve Catalog** illustrates and describes solenoid controlled panel mounted hydraulic valves. The catalog offers a complete file on the valves, emphasizing their features of construction and operation with cut-away views, piston designs, spools, J.I.C. symbols, and interchangeability of parts. Working drawings are illustrated on one page and all specifications are diagramed. Copies of Section 261 are available by writing to Rivett Lathe & Grinder, Inc., Brighton 35, Boston, or — **Circle No. B27.**

**Machine Tool Equipment** is the subject of a comprehensive catalog from Van Norman Co., Springfield 7, Mass. Illustrated and described are numerous types of milling machines and their features, and attachments, arbors and accessories. **Circle Inform-A-Gram No. B28.**

**Aro Air Tools, Air Hoists, and Automation Tools** are presented in a pocket-size 40-page catalog. Two new tools for automation are described: automatic drills, B-1 series; and "Par-A-Matic" drills, ¼" capacity. In the air tool group are grinders, wire-brush tools, drills, impact wrenches, electrode dressers, and screwdrivers and nutsetters. Catalog 62 is issued by The Aro Equipment Corp., Bryan, O., or — **Circle Inform-A-Gram No. B29.**

**A Standard Way Type Drill Unit** for special machines performs drilling, boring, reaming, counterboring, and chamfering operations with heavy cutting loads. Data Sheet 1075 from Kearney & Trecker Corp., Special Machinery Div'n, Milwaukee 14, gives complete details, including a unit description, typical cycles, and a dimensions diagram. **Circle Inform-A-Gram No. B30.**

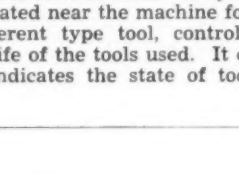
8403
do you
WASTE MONEY
RISK ACCIDENT
doing things the
HARD WAY?
Take a trip through your plant today and note how many assembly and maintenance operations are being done in awkward or tiresome positions.
Imagine
THEM BEING DONE ON
PORTELVATOR
THE MANLY HAMILTON PORTABLE ELEVATING TABLE
With Portelvator hundreds of assembly and maintenance jobs are accomplished at the right height and in the best light. And that means money in the bank and workmen on the job; faster work and fewer accidents.
Portelvator prices start at $155.00— place a couple at your workmen's disposal and watch results.
Complete description in FREE Bulletin No. P-5403.
WRITE FOR IT!
Address The Hamilton Tool Company, 832 South Ninth Street, Hamilton, Ohio
IT'S A
Hamilton Tool
USE IT WITH CONFIDENCE
CIRCLE INFORM-A-GRAM KEY NO. 149

**An Open Fronted Power Press** with instant stop system is featured in a catalog supplied by Transmares Corp., 15 William St., New York. In addition to picturing the line of Schuler presses, the catalog describes in detail their features and advantages. **Circle No. B31.**

**Solve Tool Changing and Downtime Problems** with "Cy-Co-Trol" tool control units. A cyclemeter located near the machine for each different type tool, controls the tool life of the tools used. It continually indicates the state of tool life and can automatically stop the machine when tools need to be changed. Complete details on the units are given in a bulletin supplied by Royal Design and Mfg., Inc., 4133 E. Ten Mile Rd., Centerline, Mich., or — **Circle Inform-A-Gram No. B32.**

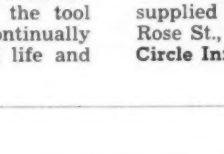
**For Distortion Free Knurling** from ⅛" to 1", use the "Knurlmaster" hand knurler. It is adaptable for use on lathes and drill presses or as a hand tool at the bench. Further information is found in a pamphlet supplied by Rockwin Mfg. Co., 45 Rose St., New York 38, or — **Circle Inform-A-Gram No. B33.**


NEW "PIN-TYPE" ARBORS



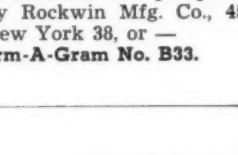
Permit you to hold squareness and concentricity in accurate relationship with the pitch line of an involute splined bore when facing or turning.

NEW "BETTER-HOLD" CHUCKS



Powerful, accurate centering fit applied easily to a shank-type cutting tool by twisting the "lock-and-eject" actuating ring. Permit quick, easy tool changes.

NEW SCULLY-DRIFT TOOLS



Simple, foolproof method for ejecting tools from a spindle or holder without hammering. Reduces tool breakage and damage to machine bearings.

SEE THEM AT THE A.S.T.E. SHOW

International Amphitheatre — Chicago, Illinois, March 19-23

NEW ACCURACY AND EFFICIENCY — PRECISION HOLDING

SCULLY JONES

FOR PRODUCTION AND ASSEMBLY — HEADQUARTERS—BOOTH 486

Scully-Jones and Company, 1913 South Rockwell St., Chicago 8, Illinois

NEW "SAFE-TORQUE" NUT RUNNERS

New, one-shot clutches for hand power tools or assembly machines permit you to tighten nuts consistantly, with controlled torque, better than you can set them by hand.

NEW "SAFE-TORQUE" TAP DRIVERS

Performance-proved on hundreds of jobs, they eliminate or drastically reduce tap breakage, increase production, and improve quality. Provide accurate torque adjustments to suit job conditions.

NEW "LOCK-AND-EJECT" ADJUSTABLE ADAPTERS

Improved collet action minimizes tool pullout. Operator merely turns the threaded nut to seat and unseat the chuck. Speed and simplify tool changes. No pounding or torsion needed.

NEW RECESSING TOOLS

Give you high production and accuracy on wide variety of operations on standard machines. New grinding fixture provides accurate method for sharpening and measuring circular form tools.

NEW "ROLL-LOCK" TOOLS

Unique operating principle provides accurate centering shrink fit for chucking parts and tools. Expanding mandrels or compression-type chucks operate quickly by twisting actuating ring.

NEW "TOOLITROL" BOARDS

New tool control method co-ordinates and expedites at-the-machine problems of pre-setting, storing, and changing tools in multiple-spindle machines. Non-productive time is reduced.

CIRCLE INFORM-A-GRAM KEY NO. 150


**Information on Aluminum Mill Products and Services** is contained in a 24-page booklet from Kaiser Aluminum & Chemical Sales, Inc. The booklet offers data on aluminum alloys, forms, mechanical and physical properties, applications, and fabricating and finishing techniques. Copies of the booklet, "1956 Product Descriptions and Availabilities", are provided by Kaiser Aluminum's Industrial Service Div'n-PR 256, 1924 Broadway, Oakland 12, Calif., or — **Circle Inform-A-Gram No. B34.**

**Various Production Operations** that can be performed by cam-operated precision boring machines are described in a bulletin. It covers precision boring, contouring, turning, facing, grooving, straight boring, plunge-facing, and chamfering. Styles 308 and 312 are featured in Bulletin 31751 which is issued by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, or — **Circle Inform-A-Gram No. B35.**

**Nineteen Models of Wire Straightening and Cutting Machines** are listed in 16-page Brochure M 55-3 issued by The Lewis Machine Co., 3441 E. 76th St., Cleveland 27. Also shown are a chamfering and deburring machine and both single and double wire reels. Complete data is charted on sizes, capacities, and speeds of both stationary cut-off and flying-shear cut-off type machines. The used sizes, capacities, and complete measurement and weight data for 10 wire reels of various types are given. **Inform-A-Gram No. B36.**

**Diamond Wheels and Hones** are detailed in a diamond wheel catalog. Each catalog number identifies the wheels as to dimensions, type, depth of diamond section, and concentration. Covered are resinoid, metal, and vitrified bond. Also given are some suggestions for getting the most out of a diamond wheel investment. The Paul L. Kuzmick Co., 271-279 Grove Ave., Verona, N. J., will supply Catalog 155, or — **Inform-A-Gram No. B37.**

**Technical Details** on shuttle-drive conveyors for all bulk material handling are found in a new bulletin. These oscillating conveyors for industrial applications are available in stationary or portable models which are hydraulically and mechanically operated. The Delpark conveyor is practical for installations of great length with extremely low head room requirement. For full details, get a bulletin from Industrial Filtration Co., Dept. SD-299, Lebanon, Ind., or — **Circle Inform-A-Gram No. B38.**

**Ace Drills** are listed in Catalog 52 from Ace Drill Corp., Adrian, Mich. These drills are produced by the "ground-from-the-solid" process which is described in the catalog. Included are type "L" drills for plastics, 12" Longboy drills, drill blanks, centerless ground reamers, solid carbide drills, and Hi-Brinell drills for hardened steel, which are not usually found as stock items.
**Circle Inform-A-Gram No. B39.**

**Metal Finishing Systems** are discussed in a new bulletin. Given are suggestions, tips, and ideas on modern ways to achieve better finishes at lower cost, faster production, and smoother handling of products. Photos show various actual applications of the systems, and one section details a typical installation. Obtain Bulletin 51 from Despatch Oven Co., 619 — 8th St., S.E., Minneapolis 14, or — **Circle No. B40.**

**"How To Use Oakite Solvent Detergents"** discusses the cleaning uses and abilities of these detergents — solvents compounded with surface active agents. Methods of application are described in detail, including procedures and solution concentration. In addition, some of the advantages of this cleaning method are pointed out. Oakite Products, Inc., 157 Rector St., New York 6, or —
**Circle Inform-A-Gram No. B41.**

**"Aircraft Steels"** gives condensed information on Army, Navy, and government aircraft steel specifications. Shown are the sizes, shapes, and qualities of aircraft alloy and stainless steels, produced in accordance with aeronautical specifications, that are available. The booklet may be obtained from Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, or — **Circle No. B42.**

**A Complete Line** of automotive, industrial, and portable air compressors are shown in a Binks catalog. Information is given on how to select the proper compressor and the features of the compressors are listed. In addition, compressor accessories are included. Get your copy of Catalog 810 from Binks Mfg. Co., 3114-44 Carroll Ave., Chicago 12, or — **Circle Inform-A-Gram No. B43.**

**Standard Clutches and Clutch-Coupling Units** for over-running, indexing, and backstopping applications are detailed in Catalog 103-C from Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich. Included are cut-away photos, cross-section drawings, application suggestions, and dimensions and engineering data. Also given are basic installation and maintenance instructions. **Circle Inform-A-Gram No. B44.**

**A New Vertical Automatic Production Lathe** is described in Bulletin V1-1 issued by Sundstrand Machine Tool Co., 2531—11th St., Rockford, Ill. It is a standard machine with platens for mounting: turning or grooving slides, multiple tool slides, or tracer slides. Several tooling setups are included to show the wide range of application that the machine has. **Circle No. B45.**

**Farquhar Heavy Duty Hydraulic Presses** are used to make forgings and stampings, and for plate forming. They feature positive control of all high pressure valves and economy in operation. The complete line of presses is shown complete with specifications in Catalog HP-49 from The Oliver Corp., A. B. Farquhar Div'n, York, Pa., or — **Circle Inform-A-Gram No. B46.**

**An Indexing Turntable Catalog** covers about 150 types of indexing and rotary turntables and tables that can be set to almost any desired angle. Catalog 88-56 has been released by Eisler Engineering Co., Inc., 750 S. 13th St., Newark 3, N. J., or — **Circle Inform-A-Gram No. B47.**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CIRCLE INFORM-A-GRAM KEY NO. 151

**Cold Rolled Spring Steels** are highlighted in a Sandvik catalog. The raw materials used and Sandvik's processing methods and facilities are discussed. Ordering information is given for cold rolled and bright annealed spring steel; and hardened, tempered, and polished spring steel. Tables give the weight of spring steel in lbs/100 ft and a comparison of wire gauges in common use in the U. S. Also included are several conversion tables. Sandvik Steel, Inc., 1702 Nevins Rd., Fair Lawn, N. J., or — **Circle No. B48.**

**"Ucon Fluids and Lubricants"** covers the properties, applications, and characteristics of these polyalkylene-glycol derivatives. They're used as mechanical lubricants, hydraulic fluids, heat transfer fluids, anti-foam agents, and formulation components. They have high viscosity indexes and low pour points and are non-carbonizing and non-corrosive. The booklet, Form 6500D is made available by Carbide and Carbon Chemicals Co., 30 E. 42nd St., New York 17, or —
**Circle Inform-A-Gram No. B49.**

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CIRCLE INFORM-A-GRAM KEY NO. 152


**Precision Gages** are highlighted in Catalog 105 from Metro Tool and Gage Co., 4240 Peterson Ave., Chicago 30. Among the gages included are thread plugs and rings, truncated set plugs, tapered pipe plugs and rings, and plain cylindrical plugs and rings. In addition, the catalog gives Unified and American Standard pitch diameters, a method of thread measuring, and the dimensions of thread plug and ring gages and cylindrical plug and ring gages. **Circle Inform-A-Gram No. B50.**

**Inverted-Y Overhead Crane and Runway Electrification** is discussed in Catalog 2021-A from The Cleveland Crane & Engineering Co., Wickliffe, O. The catalog contains installation information, and drawings showing conductor assembly. In addition, it contains the necessary data for ordering the aluminum Inverted-Y conductors, supports, and collectors for any normal application requiring current in amounts of 300 to 1000 amps. **Circle No. B51.**

**"Proved Answers To Successful Automation"** tells about automation through photoelectric control. With this control there is no contact with the material being controlled and no mechanical linkages are needed. A bulletin pictures the ready-to-use photoelectric units and other equipment that is available to handle particular jobs. The controls are used for starting, detecting, indexing, stopping, etc. Get Bulletin PA 555 from Electronics Corp. of America, 720 Beacon St., Boston 15, or — **Circle Inform-A-Gram No. B52.**

**A Metal Sheet Pack Turnover** is used for turnover between blanking and drawing, etc. The machine is available in two models—to handle sheet sizes from 16" x 16" to either 36" x 36" or 36" x 44", and of any thickness. The pack of sheets is picked up on a skid and loaded into the machine by means of lift truck. Details are found in an illustrated bulletin made available by Dexter Folder Co., 330 W. 42nd St., New York 36, or —
**Circle Inform-A-Gram No. B53.**

**An Engineering Manual** has been prepared so that practical engineers and shop men will understand where and when to use Zagar tools and how to apply them. Included are collets, collet fixtures, and drilling and broaching equipment. Each tool is illustrated and described together, with specifications and diagrams. Application photos show the tools in use in a shop. For copies of Engineering Manual T-3, contact Zagar Tool, Inc., 24000 Lakeland Blvd., Cleveland 23, or —
**Circle Inform-A-Gram No. B54.**

**Production Convenience and Rigidity** with tool room precision and versatility are features of the Gray openside planer cub. A bulletin details the machine's features which are pictured, diagramed, and explained. One page is devoted to giving the principal dimensions and specifications. Get your copy of Bulletin 55-R2 from The G. A. Gray Co., 3611 Woodburn Ave., Cincinnati 7, or — **Circle No. B55.**

**Make Up To 1500 Bends/Hr** with the low-cost bench model automatic tube bender. Model B4 "Bend-ex" will bend metal tubing of steel, aluminum, brass, copper, or stainless steel up to ⅝" O.D. x 3" centerline radius. Details on the Model B4 "Bend-ex" tube bender are found in a circular from Paul Machine Tool & Die Works, Machine Tool Div'n, 4600 S. Kedzie Ave., Chicago 32, or — **Inform-A-Gram No. B56.**

**Plant Applications** of cast aluminum tooling plate and bar stock are covered in a Red Seal brochure. One section shows the equipment that has been designed for producing the aluminum plate to assure quality. Tables give the plate and barstock sizes. Copies of the brochure, "Red Seal Aluminum Products", are issued by Red Seal Metals Co., 10035 Burtis St., S. Gate, Calif., or — **Circle Inform-A-Gram No. B57.**

**"Increased Production With Feedall Automatic Feeders."** This catalog covers special selector devices; vibratory feeders; thru-feed and transfer conveyors; and elevating, tumble, and blade feeders. Each model is pictured and discussed and its specifications given. Copies of the catalog may be obtained from Feedall Inc., 38399 Pelton Rd., Willoughby, O., or — **Circle No. B58.**

**40 Series Horizontal, Boring, Drilling, and Milling Machines** are introduced in Bulletin 402 from Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. These floor type flexible machines will handle profitably both short runs and quantity production. The bulletin pictures the machines and contains diagrams of the underarm and attachments. **Circle Inform-A-Gram No. B59.**

**A Thread Plug and Ring Gage Catalog** features a 4-page illustrated visual index which makes it easy to find and select proper gages for every application. Included are complete tables of sizes and prices for each type gage and information on the use and selection of gages. A copy of the 32-page Besly-Metro Gage Catalog is supplied by Besly-Welles Corp., Beloit, Wis., or — **Circle Inform-A-Gram No. B60.**

**Step Drilling** with Ex-Cell-O quill type hydraulic power units is detailed in a 20-page bulletin. Step drilling is an automatic process involving alternate drilling and withdrawing until the required depth is reached. The units are also used for counterboring, spot facing, and reaming when incorporated in special machines. Bulletin 45352 showing 4 sizes of these units for feeding and rotating cutting tools is provided by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, or — **Circle Inform-A-Gram No. B61.**

**"Automatic Production Control"** tells how Reeves can solve your problems in any of 5 basic processes. They include controlling tension, controlling velocity and peripheral speed, maintaining uniform temperature and pressure, controlling acceleration and deceleration, and synchronizing one or more machines. Accurate regulation of machine speeds is possible with Reeves variable speed drives which are illustrated and described in Bulletin G-537 from Reeves Pulley Co., Columbus, Ind., or — **Circle No. B62.**


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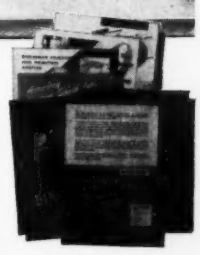


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CIRCLE INFORM-A-GRAM KEY NO. 153

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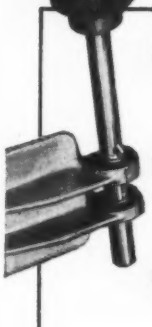
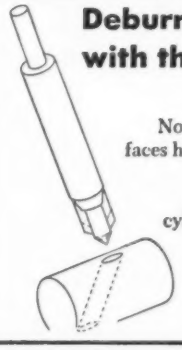


1. Insert NOBUR tool in any machine spindle. A light pressure of the revolving cutter-blade against the workpiece quickly deburrs the outside surface.
2. After outside surface is deburred, slide, knurled-sleeve back to fully retract the cutter-blade below pilot body diameter.
3. With cutter-blade retracted move workpiece, or tool to position for deburring inside surface. Raise (project) cutter-blade and advance tool or work piece to deburr first one surface then the other.

## HERE'S ANOTHER PROBLEM SOLVED



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permits fast, precise positioning of work-piece from ONE SET-UP. No unclamping and reclamping on your standard vertical mill equipped with ADVANCE Cross-Slide Rotary Table. Only your milling machine's table movement limits the size radius you can cut.

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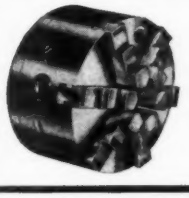
## compare HORTON Tru-Set FEATURES



- Repetitive accuracy to .0002" T.I.R. guaranteed
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- Instant peripheral location – 3 operating pinions
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- Packed in reuseable airtight metal containers

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| SIZE | MODEL | NET PRICE |
|---|---|---|
| 5 | 5T6 | 86.35 |
| 6 | 6T6 | 120.65 |
| 8 | 8T6 | 167.65 |
| 10 | 10T6 | 247.65 |
| 12 | 12T6 | 298.45 |

Chucks listed above are 6 jaw universal type with two sets of jaws. See your Horton Distributor or write direct for new Net Price Selector

HORTON CHUCK **HORTON CHUCK**
WINDSOR LOCKS, CONN.

CIRCLE INFORM-A-GRAM KEY NO. 1543

## NMTBA Picks Sales Conference Committee Head

Joseph T. Vinbury, Sales Manager of Abrasive Machine Tool Co., E. Providence, R. I., has been appointed by the Machine Tool Builders' Association to head its Sales Conference Committee. As chairman, Vinbury and his committee will start planning immediately for the Machine Tool Builders' Sales Conference, to be held sometime this summer at one of the nation's leading universities. Actual site has not yet been determined.

The conference, a two week seminar, will be conducted for members by a faculty of outstanding sales, marketing, and advertising authorities. Vinbury was a member of this faculty at the 1954 conference at Cornell University. He has been on the NMTBA's Advertising and Market Research Committee for the past six years and formerly was in charge of advertising and sales promotion for The New Britain Machine Co.

## Lawyers Explain Vital Need for Patent Examiners

American industry is facing long delays in obtaining patent coverage for products and processes otherwise ready for the market because the size of the examining staff has not kept pace with the increased number of patent applications being filed, reports the New York Patent Law Association. The average prosecution time per patent has stretched to 3½ years, they note.

The Patent Examiner holds a key position in the advancement of American technology, the Association points out. The only way to reduce these delays and to clear the way for marketing the new products and processes is to employ new Examiners to pass upon the backlog of applications.

Steps have already been taken in this direction and over 100 new Patent Examiners have been added to the examining staff since last June. It is understood that the Patent Office plans to build this number up to a total of 350 new Examiners by the end of this year.

There are immediate openings for engineers and scientists who can accept appointments as Patent Examiners. The New York group maintains that technical graduates who apply will find the job interesting and challenging and one in which they are kept in close touch with the latest technical developments. The job also offers opportunities for advancement within the Patent Office.

The salaries for Examiners start at $4,345 a year, and it is possible to reach a salary of $7,570 in 5½ years. Engineers and scientists holding a college degree in engineering or applied science, or a degree with a major in chemistry or physics, or with certain combined credits in these fields, are eligible for appointment as Patent Examiners, without examination, upon application to the Commissioner of Patents in Washington.

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CIRCLE INFORM-A-GRAM KEY NO. 155

# INCREASING EMPLOYEE JOB SATISFACTION

*by Ernest W. Fair*

A SATISFIED WORKER is a good worker. His productive effort bears good results. He is genial and cooperative and gets along with his fellow workers as well as management. His accident ratio is reduced to a very small figure. In other words, he is the ideal type of employee every executive wants on his payroll.

Good working conditions, pay and opportunity for advancement are recognized first steps toward employee satisfaction. It is admitted by one and all that management can hardly expect the cooperation from its employees that it seeks without these three being present.

There is much more to insurance of job satisfaction for any employee. The three foregoing factors provide the foundation upon which the program can be built. To this must be added as many steps as can be taken from time to time in a continuing program . . . which should never approach the point of pampering, however.

Much of our program is nothing more than educating employees to their position within the company, to the firm's aims, to its place in society and in the economic world, and to the fact that they are working for the best possible firm regardless of what any trouble-makers or agitators may tell them.

Employees well educated in the company and its policies, in their role with the company, their responsibilities to the firm and its customers, and the firm's responsibilities to them, are always much more satisfied at their jobs than those where management works on a program embracing only the three main essentials already mentioned.

Here are a number of points which should be covered by the program to increase employee job satisfaction and thereby increase the value of every man to the organization:

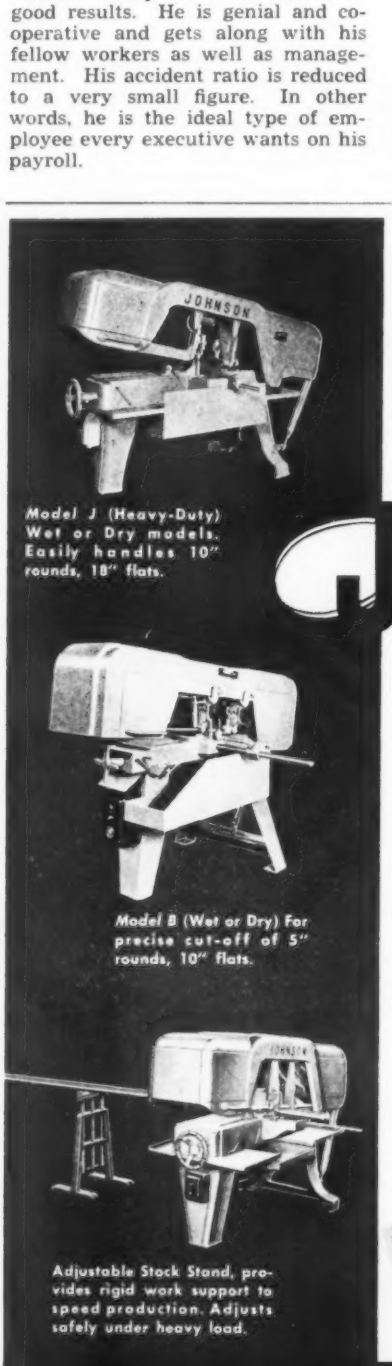
**Complete Knowledge of Company Rules and Regulations,** AND the WHY of each and every one of those rules. Often a rule stated in cold type leaves much to be understood by the employee. He or she will normally follow that rule but never with the enthusiasm present when they fully and completely understand the reasons why the rule has been set up.

No regulation of any kind, no matter how small, should ever be set down by the company management without some sort of an explanation of the need for that rule. We cannot take it for granted that every employee will understand without reason or that his reasoning will provide the proper interpretation. And, the "obey it or else" system has long vanished from the American scene.

**Understanding of Company Importance,** not only in the business world but in the community life and structure of our society, is next. Our enthusiasm is always greatest on those projects which we feel are of most importance; this applies equally well insofar as the employee and his job is concerned.

The man with instinctive pride in the company for which he works is a goodwill ambassador we could not buy for thousands of dollars; the most effective weapon we have against general public misunderstanding. Satisfaction with one's job and pride in that job go hand-in-hand.

**Faith in His Own Importance to the Company.** The employee who feels that he is just another faceless cog in the machine and can be replaced at the whim of some unknown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FAST • TOUGH • ACCURATE

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CIRCLE INFORM-A-GRAM KEY NO. 156

higher executive at any time has little faith or confidence in his job or the company. Each employee must feel that he as an individual is important to the company management. He must feel that the company appreciates his good efforts and that he is a lot more than a social security number to the firm.

Any executive can fully appreciate the importance of this factor by considering his own position in the same light. He knows that he works harder at his job when executives higher up have made him feel important and given him evidence of his importance to the company. The men who work under him are no different; they have the same feeling and the same reactions.

**Understanding of Company Problems** should go far beyond the executive circle. In those organizations which make it a policy through meetings, company house organs, and other methods to tell even the lowliest worker about the company problems, there is always much more accomplished with less effort.

A full understanding of the company problems, big and small, by the average employee makes that employee a much more efficient worker and a much more satisfied individual. He does his own job much better as he understands how what he does fits into a solution of the overall problems of the company business.

These problems also run over into the field of public relations, with every employee working as an unofficial public relations man. The employee who understands thoroughly the problems of his company can meet any questions directed at him by outsiders with answers that contribute to community goodwill.

**Confidence and Pride in the Company** always means much more satisfied employees, less labor troubles and better output from each individual. Confidence and pride in the company inspire more creative work effort by each individual.

These attributes are born from carefully planned company policy directed toward that end. They are attained by executive examination of each and every employee management problem in the light of whether it will automatically build such confidence and pride, or whether explanations are in order to make sure such a situation is attained.

It has also been noted in scores of surveys that those firms which work hard at maintaining confidence and pride in the employee ranks are those with the very lowest rate of employee turnover. This holds true in some instances where many other factors are even ignored.

**Assurance of Fair and Impartial Treatment** is of great importance to an employee's satisfaction with his job. Any individual who must work under a constant cloud of uncertainty is an individual giving little more than he must to his job. His efficiency is always greatly reduced.

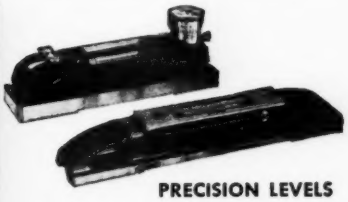
Such assurance comes from more than mere declaration of management policy toward attaining fair and impartial treatment; the convincer comes in actual demonstration of the policy at every opportunity. The employee will be sold on the existence of such a situation by what he sees done in handling the incidents that arise among his fellow workers and how he, an individual, is handled in his first case of dispute.

This first test must be handled with utmost tact by supervisory personnel, for the impression left remains long thereafter and one mistake made in the first dispute will never be forgotten no matter how much a supervisor may lean over backward in the future.

**Freedom to Offer Suggestions and Criticisms** is of the utmost importance in employee relations toward building greater job satisfaction. The individual who feels that management will never be really interested in his ideas soon loses enthusiasm for his job. He who knows he can


*precise dependable controls for*

**PRODUCTION TOOL ROOM MAINTENANCE**



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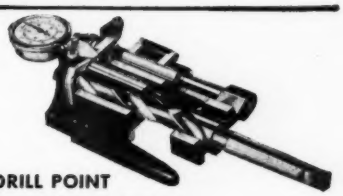
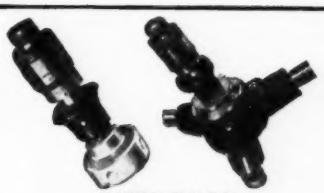
Of case-hardened tool steel, ground, lapped and optically checked. Guaranteed for straightness, squareness and parallelism. Lengths from 3" to 36".



**DRILL POINT MEASURING GAGES**

To check angle and centrality of twist drills. Available in two types; with dial indicator, for ¼" to 2½"; with screen indicator, from $\frac{3}{4}$" to ¼".

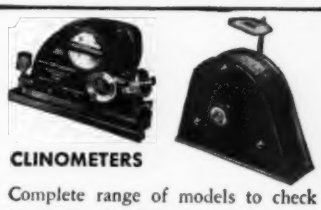


**MICRO-MAAG INTERNAL MICROMETERS**

Available in individual units or sets: ¼" to 1" direct reading to .00005"; 1" to 2" direct reading to .0001"; 2" to 8" direct reading to .0002".

**WATTS MICROPTIC WATER LEVEL**

For aligning large machine tools, engines, generators, and similar applications. Particularly useful for positions widely spaced or obstructed. Micrometer readings direct to .0005"



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Complete range of models to check any inclination from horizontal plane over 360°. Reading to 1 minute of arc — remains fixed until released. Light, portable, resistant to shock.

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EQUIPMENT COMPANY
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always ask questions or even criticize has much more faith and confidence in the company and his job.

Not only is this factor of importance from the employee job satisfaction standpoint, but experience has shown that where it exists many excellent suggestions and ideas come up from the employee ranks.

There are, of course, many additional factors which contribute to greater employee satisfaction with his job. The foregoing offer a start toward a program which will give us maximum efficiency at every post, more extra enthusiasm for the job, fewer labor troubles, and greatly reduced job turnover.

*The Inform-A-Gram Card is Located on Page 142.1*

the cutting characteristics and life of your taps are important factors in your costs of production.

BLAKE Flute and Chamfer Grinders can make substantial savings possible in your threaded-hole costs. They do this by creating or restoring:

1. Exact indexing of cutting edges.
2. Efficient rake angles for each job.
3. Correctly ground spiral points.
4. Perfectly relieved chamfers.

The accuracy and dependability of the Blake Flute Grinder and Blake Chamfer Grinder make it possible for you to do high-efficiency tapping . . . the *only* kind which pays off in profits today!

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MANUFACTURERS OF FLUTE AND CHAMFER GRINDERS
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CIRCLE INFORM-A-GRAM KEY NO. 158


## Radiographic Unit Amplifies Light 40,000 Times

A new Bendix development called the Lumicon amplifies light electronically 40,000 to 50,000 times, revealing even a blacked-out scene as a bright television picture. Linked with x-ray, it projects a bright "alive" image on a television screen but works with only low-level x-ray energy.

The light amplifier will have an important impact on many processes which are basic to science and industry, reports LeRoy D. Kiley, general manager of the Friez Instrument division of Bendix. One possible application will be the immediate x-ray inspection of forgings, castings, engines in operation, and similar large objects.

Basically, the system applies new electronic concepts to closed television circuits, Kiley explains. It consists of a detector unit, or image orthicon tube, connected through amplifiers and cables to a monitor unit similar to a standard television picture tube. A "light tunnel" containing a fluoroscopic screen is added to the detector for x-ray purposes. Through light amplification, a television picture thousands of times brighter than that of the fluoroscopic screen is produced.

## NBS Offers New Stainless Steel Standard Samples

The National Bureau of Standards has announced the availability of 6 new standard samples of stainless steel. They're designed for calibrating and checking spectrochemical methods of analysis.

Together with a set of 3 spectrographic standards issued earlier, NBS standards now provide certified concentration values for determining most of the elements encountered in the analysis of stainless steels. These new standards are certified for concentrations of manganese, silicon, copper, nickel, chromium, and molybdenum. Samples are available in 2 forms: rods 7/32" dia and 4" long, and rods ½" dia and 2" long.

The stainless steel standards may be obtained from the National Bureau of Standards for a fee of $8.00 each.

# LONG-RANGE PLANS MUST BE EVALUATED BY TWO CRITERIA

Business executives should evaluate long-range plans for their companies by two principal criteria — the return on gross investment assets used, and the relative stability of the various projects under consideration — West Coast industrial leaders were told by Robert C. Tait, President of Stromberg-Carlson, a division of General Dynamics Corp., and a Senior Vice President of the latter firm.

Speaking on "Planning for Company Expansion" before the Industrial Economics Conference sponsored by Stanford Research Institute, Tait said that "the extent to which a proposed project or product supplements present market lines" also is an important consideration in corporate planning. For example, at Stromberg-Carlson, "a new market for an existing product, or a new product for an existing market, gains more weight in our judgment than projects which are brand new in both respects."

In this regard, he cautioned that "it is much harder to sell a product than to make it," and he commented that some companies do not give sufficient consideration to this factor in their planning.

In discussing long-range planning, Tait said, "I think it is a sound tenet of good management that decisions should be made at the lowest possible level. By giving the departments and the divisions the opportunity to submit their plans, we are fairly well assured that no aspect of the business will be overlooked, and we also get much of the important work done at the level where the greatest degree of specific knowledge exists." Tait describes this as "bottom-up planning."

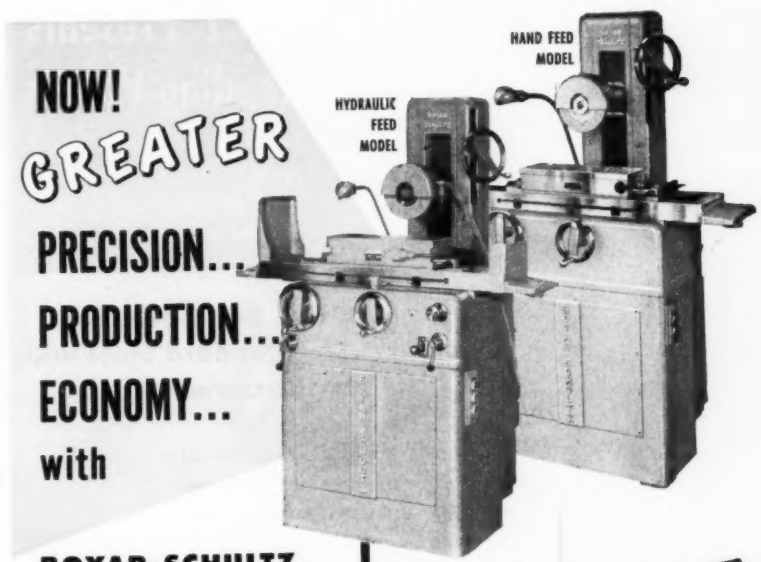
Plans submitted by the various departments and divisions at Stromberg-Carlson, he explained, are analyzed and evaluated by the treasurer and his staff. This central planning department is responsible for study and forecasting of the general economy, market analysis and research, determination of capital budgets and long-range appropriations, and final determination of product line goals that will fit into the overall company pattern of availability of capital facilities, engineering, and technical manpower.

In the average industry, Tait commented, "five years seems to be the minimum number of years for which we should try to plan ahead."

"Actually," he said, "it frequently takes longer than that to dream up a new product, perhaps uncovered in our Research Department, and then refine it for commercial application, redesign it for production, subject it to field and market tests, eliminate the 'bugs' and get it into quantity production, and then successfully gain public or commercial acceptance for volume sales. It also takes time to plan and build the new facilities that may be required, to plan the type and timing of new facilities financing that may be needed, to train the required supervisory personnel, and so on."

Some industries must plan even farther ahead than that, basing their forecasting on general trends, but most businesses would be doing "too much crystal-balling" if they attempted to project their plans more than five years, Tait remarked.

The newly-developed Flow-of-Funds report issued by the Federal Reserve Board "will do much to increase our knowledge of what is happening in our economy," and will be of great value to business planners, he declared.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*Available in Hydraulic and Hand Feed models.*

These machine tools are of the most advance design, fully proved and enthusiastically endorsed by users who must have accuracy as well as production performance.

Exclusive features include heavy duty precision spindle; vertical column assembly supported by horizontal cylindrical ways; closely grained nickel alloy table with longitudinal ways of hardened and ground tool steel; vertical feed assembly with precision ground worm gear perfectly fitted to bronze gear for easy operation.

Hydraulic operation is accomplished by controls A and B above. These controls automatically disengage longitudinal and cross feed hand wheels.

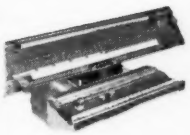

Table ways, one V and one flat are ground and hand scraped. They travel on hardened and ground tool steel ways.

Precision screw on vertical feed assembly turns through a perfectly fitted steel worm and bronze gear, operating in grease packed, sealed gear box.

Unique column assembly combines vertical and cross feed travel. Sturdy vertical column has oversize bearing surfaces. Hardened and ground cylindrical ways provide accurate long wearing surface for cross feed travel.

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CIRCLE INFORM-A-GRAM KEY NO. 159

# How to Grind Titanium with Coated Abrasive Belts

*by Dr. Hugh N. Dyer*
Director of Product Testing
BEHR-MANNING DIVISION
Norton Company
Troy, N. Y.

UNLIKE OTHER STRUCTURAL METALS, titanium has unusual chemical and physical properties which pose certain problems when grinding it with coated abrasive belts. Titanium is so reactive at the temperatures generated in grinding that abrasive grains rapidly become dulled or flattened because of partial solution in, or chemical reaction with, the hot metal. These grains, dulled by attritious wear, then slide over the surface of the metal, creating additional heat but doing little useful cutting.

Successful grinding of titanium with abrasive belts depends upon reducing attritious wear by lowering the temperature at the grinding point and by using grinding fluids which form protective films over the freshly cut metal surfaces. Desirable fracture wear, which exposes fresh cutting edges, is promoted by using the right belts at the right speeds with the right contact wheels and grinding fluids.

### The Right Belts

Silicon carbide coated abrasives give the best results in grinding and finishing titanium. Paper-backed belts, used either dry or with an oil or grease, are suitable for some flat sheet work. Where the backing must be more rugged, cloth-backed belts are used. Synthetic resin bonds provide maximum durability. When water-base grinding fluids are used, fully waterproof cloth-backed products are necessary. Grits 40 to 80 are recommended for roughing and spotting operations, and grits 120 and finer for high finishes.

### Belt Support

The contact roll supporting the belt should be as small in diameter and as hard as practicable. This provides almost line contact and high unit pressure between abrasive belt and work. Heat build-up, dulling, and glazing are reduced, and fracture wear is promoted by using hard rubber, plastic or metal contact wheels. Flat shoes or platens, and soft rolls usually lead to rapid belt failure from dulling. An exception is the use of a softer rubber roll for blending and spotting, as in the removal of small defects in sheet or coil, either before or after final reduction.

### Belt Speed

A very low belt speed reduces the temperature at the grinding point, retards reaction between metal and abrasive grain, and promotes fracture wear. When a grinding fluid is used, speeds between 1500 and 2500 sfpm are recommended. For dry grinding, speeds between 1000 and 1500 sfpm give good results. Low belt speed also reduces the tendency for the sheet surface to be scorched or marred by accumulations of incandescent chips.

### Grinding Fluid

Grinding fluids, in addition to cooling and quenching the spark, can reduce the reaction between metal and abrasive grain. A grinding fluid should always be used when taking continuous cuts over fairly large areas. For interrupted cuts, such

**References**

1. Yang, C. T. and Shaw, M. C., "The Grinding of Titanium Alloys," Office of Technical Services Report PB 112049.
2. U. S. Air Force Machinability Report, Vol 3, Titanium. Curtiss-Wright Corp., 1954.

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Standard Steel gage blocks at prices which any shop can afford. Top quality. Typical Webber values.
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as spotting defects in sheets or bars, or offhand grinding of small parts, dry grinding at speeds not exceeding 1500 sfpm will give good results.

Heavily sulfurized and chlorinated cutting oils are good grinding fluids, and can be used with non-waterproof coated abrasive belts. Because of the extremely hot spark obtained in titanium grinding, only oils of the highest flash point (above 325° F) should be used. The fluid should be introduced close to the grinding point for rapid spark quenching, and any exhaust or dust collecting system must be designed to minimize the fire hazard.

Water-base grinding fluids present no fire hazard and are relatively inexpensive, but they do require the use of waterproof coated abrasive belts. Conventional soluble oils in water are poor grinding fluids for titanium, but may sometimes be useful where the alternative is grinding dry at speeds in excess of 1500 sfpm. Rust inhibitors of the nitrite-amine type give good results when used with water. Among the most effective water-base fluids found so far are 5% solutions of sodium nitrite or barium nitrate (see reference 1, pp. 8 and 36). Since all water-soluble barium compounds are poisonous if swallowed, and since contact with eyes or skin should be avoided, barium nitrate is not recommended for commercial applications.

There is not very much information available at the present time on the economics of grinding titanium with coated abrasive belts on a production basis. However, it is estimated that, under good grinding conditions, it will cost approximately six to ten times as much per cubic inch of titanium metal removed as it would cost to remove the same volume of stainless steel.

Improvements and new developments in machine tools using coated abrasives, and in grinding fluids, will undoubtedly reduce grinding costs. Even at present costs, the abrasive belt grinding of titanium and its alloys is giving excellent results at costs competitive with other methods of stock removal. These recommendations are applicable for grinding either commercially pure titanium, or the common alloys.

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## Automation Expert Advising Indian Machine Committee

The Washington representative of one of the leading producers of automation machine tools, John D. Elliott, has been selected by the Government of India as an advisor to its Machine Tool Committee.

Elliott, Washington representative for The Cross Co. during the past two years, has left for New Delhi on his new assignment. There he will review India's present machine tool capacity and requirements and its facilities for developing machine tool designers, and make recommendations as to expediting machine tool deliveries and as to size and scope of new factories. He also will correlate the range of general purpose railway tools with proposed machine tool requirements.

Saves Time, Saves Money
- - and Does the Job Better

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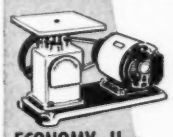
KELLER
Die Filers

DELUXE: Files, Saws, Laps. Has File Roller Support Arm and Overarm.

Standard: With File Roller Support Arm for Maximum Accuracy



ECONOMY: Has no File Roller Support Arm or Overarm.

- Self Compensating File Chuck
- Wide Capacity— 1/8" diam. to 1/2" x 5/8" Files.
- Throat Depth 7 1/4"
- Two Speeds— 350/450 strokes per minute.
- Full 1 1/2-Inch Stroke.

**Built-for-the-Job** Handles all shapes and sizes of files from 1/8" diam. to 1/2" x 5/8". File Roller Support has full 6-inch adjustment for Maximum Accuracy on all jobs.

**Large 8 1/2" x 8 1/2" Worktable** with plenty of room for clamping guide blocks, etc. Table tilts up-to 15-degrees in any direction and is locked by four knurled thumbscrews.

**Long, Dependable Service . . .** the Scotch Yoke is splash lubricated and equipped with Oilite Bearings throughout.

**Plenty of Power** — 1/4 H.P. 1800 rpm motor.

Write for Bulletin 256, and your distributor's name.

SALES SERVICE MACHINE TOOL CO.
2351 University Ave. St. Paul W14, Minn.

ACCESSORIES: Steel Floor Stand, Hinged Belt Guard, and Gooseneck Lamp.

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Power Die Filers

Built by the makers of KELLER Power Hack Saws
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Finest Tool Steel at Rockwell 60-62C. Precision Ground Concentric to Max. .00025 T.I.R.

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This sketch briefly describes the cost of typical parts made for one of our earliest customers, whom we have served for the past thirty-four years.

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The cost of blanking, piercing and forming, including all tools:
First 100 . . . . . $69.25
Each add'l. 100 . . . . . 4.50
Plus actual cost of material used for stampings.

We have the nation's very best facilities and know-how to produce short-run stampings at the lowest possible cost. Send your sketch, blueprint, or part, plus quantity, for prompt quotation.

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# MICROSTRUCTURES OF DIAMOND SURFACES

by S. TOLANSKY, Ph.D., D.Sc., F.R.S.

The remarkable pictures obtained by Professor Tolansky in his research laboratory and reproduced in this book (many of them never before published) enable fundamental new deductions to be made regarding the nature of diamond surfaces and therefore of the growth of diamond.

The text is written for the general reader and includes an elementary introduction to the optical techniques developed by Professor Tolansky that make such photographs possible. These techniques enable height or depth features as small as one twenty-five millionth of an inch to be resolved and effective magnifications in depth of half a million times to be made by simple and inexpensive means. One hundred and forty-three of these extraordinary pictures are reproduced as special plates in this book. $8.50* per copy.

CONTENTS:
The Optical Techniques
Some Characteristics of Diamond
The Topography of the Natural Octahedron Faces
The Nature of the Trigons
Some Growth Features on Octahedron Faces
Linear Discontinuities on Diamonds (Slip?)
The Etching of Diamond
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## MICROHONING MACHINE ADAPTED TO ID-OD HONING

In an installation just completed for a company manufacturing precision recoil mechanisms, the new heavy duty Model 450 Hydrohoner has been adapted to an ID-OD application featuring a minimum of setup changeover time.

The Hydrohoner, designed and built by Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, has a maximum 50" hydraulic head stroke and a work diameter capacity of 15". It is equipped with an eight-speed transmission, variable delivery hydraulic pump, tank unit, controls, and a safety interlock to hold the head in the up position. It is equipped with either remote control manual mechanical feed or automatic hydraulic tool expansion.

The machine is constructed so that after the ID honing of the recoil cylinder is completed, the table moves out to clear the spindle for the OD honing of the floating piston rod. For ease of loading and inspecting, the internal honing fixture has a tilt-down feature. The rod, keyed to the spindle in the upper end and mounted on a live center at the bottom, is rotated and reciprocated through the OD tool.

In removing approximately .025" stock from the cylinder and .006" stock from the rod, a geometric tolerance of .0001" is held while obtaining a 1.5 micro-inch finish.

## UNIQUE RAIL DESIGN ELIMINATES TURNOVER STATIONS

Rugged horizontal way units now perform a series of milling, drilling and tapping operations required in the production of intake manifolds, because of a unique rail arrangement incorporated in the Snyder segmented transfer machine.

By turning the intake manifold up on edge and transferring it from station to station with a transfer bar arrangement, all machining operations are performed without turning the workpiece over. Turnover fixtures and stations being eliminated, the machine is more compact and the overall length shortened.

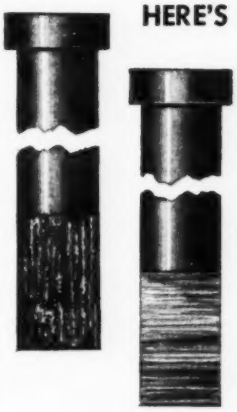
Whereas a workpiece is conventionally transferred on two horizontal rails that are parallel in a horizontal plane, the rail assembly in this machine is arranged so that the two horizontal rails are parallel in a vertical plane. Retaining strips on top and bottom ways prevent the manifolds from falling away from the rails, and previously milled surfaces on the manifolds are held in contact with the ground, angular rail surfaces as the workpiece slides from one station to another.

This 7-segment, 20-station, 54' long transfer machine was designed and built by Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7.


DURABLE

The 1-2 PUNCH that KO.'s PRESS DOWN-TIME PRODUCTION DELAYS

HERE'S THE SECRET OF DURABLE'S SUCCESS:



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. . . gives a "grinding grain" parallel to plane of action—reduces friction, heat, firing and galling.

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. . . chrome carbide has 25% less friction than plain steel—further reduces friction, heat, firing and galling.

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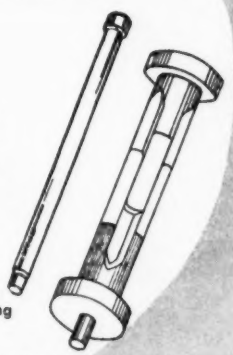
GIVES MUCH LONGER PUNCH LIFE

Write today for full details on YOUR punching problems. You'll receive a fast, practical reply from the most DEPENDABLE punch maker in the world!



DURABLE NIB PUNCH gives improved punching on harder alloys.

DURABLE INTERMESH SLEEVES supports Punch so as to perforate metal many times thicker than hole diameter

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CIRCLE INFORM-A-GRAM KEY NO. 163

## TOOL SHOW PREVIEWS

- As a part of the show theme, "Tooling for Tomorrow," Vascoloy-Ramet Corp. of Waukegan, Ill., will display for the first time a new line of face mill cutters designed around the V-R elevator toolholder principle. They feature the use of throw-away carbide inserts and will soon be available in four sizes with 4" to 10" diameters. The complete Vascoloy-Ramet tool line will be shown at Booth 1137. (S59)

- The Process Machinery Division of The Cincinnati Milling Machine Co. of Cincinnati, Ohio, is to introduce the Cincinnati Induction Hardening Machine and show the Cincinnati Flamatic Hardening Machine selectively surface harden automotive sprockets in a production run at Booth 100. Automotive turbine shafts will be run through the fully automated Induction Hardener. (S60)

- A "heavy duty" gage block set containing 84 blocks and the accessories needed for a complete gaging system is one of the new items which will be shown by Webber Gage Co. of Cleveland. The set will assemble into any desired length and into dividers, scribers, and height or snap gages. It is available in accuracies of ±0.000008" or ±0.000004". Other new products on display in Booth 936 will include "laboratory master" gage block sets, "laboratory master" linear gage blocks, "thin block" gage sets, a height gage, Davidson surface interferometer, and "Temp-Chek" temperature meters. (S61)

- A whole line of precision fasteners, including high torque set screws, ultra high strength wrenches for accurate tightening of socket head screws, and Hi-Ti titanium aircraft fasteners, will be displayed by the Standard Pressed Steel Co., Jenkintown, Pa., at Booth 479. SPS micro screws and self locking nuts, Unbrako cap and set screws, dowel pins, and shaft collars will also be shown. (S62)

- The Beckett-Harcum Co. of Wilmington, Ohio, will be showing their complete line of air and hydraulic valves as well as the W-20 and C-16 air thrust drilling and tapping machines at Booth 545. They are featuring the new BVP series of piloted air valves which have the advantage of very fast reaction, the dependability of positive pressure piloting, and very low current drain. (S63)

- A complete die set line will be displayed by Superior Steel Products Corp. at Booth 338. Main attraction at the exhibit will be Superior's recently developed removable Cap guide pin which eliminates punch holder binding in separating die sets. (S64)

- New guide pins and bushings, engineered to improve die set accuracy, appearance and performance, will be introduced by The Producto Machine Co. of Bridgeport, Conn., at Booth 396. The guide pins have been improved with greater press fit lengths, smoother end radii and mirror-like surface finish. The master bushings have five new design features, including new standards for relief, ground shoulders, and ground lead on press fit. (S65)

- Lapeer Mfg. Co., Lapeer, Mich., will feature a complete line of toggle action clamps at Booth 5531. Highlighted will be the heavy duty clamps which are either air or oil operated. (S66)


Introducing new ROTARY

## TOOL SHOW PREVIEWS

- Porter Precision Products of Cincinnati, Ohio, and its subsidiary, The Durable Punch & Die Co. of Chicago, will be represented at Booth 216. The combined exhibit will include piercing head type punches and die buttons, Bal-Lok interchangeable punches and interchangeable die buttons, and intermeshing sleeve punches. (S67)

- A display of precision checking instruments that measure variations as small as .0001" on parts taken from mass production runs can be seen at Booth 1030. Among the instruments will be the Geneva dial indicators, dial indicator test set, bench center set, test set with magnetic base, bench gages, and dial shop gages. Features of the Geneva dial indicators include continuous and balanced reading dials, threaded stems for special fixtures, and special internal lever movements which eliminate complex gears and increase accuracy. They will be shown by Chicago Dial Indicator Co., Chicago. (S68)


# streamlined TORRINGTON SWAGING MACHINES

*featuring...*

- maximum capacity for size and power
- convenient location of controls
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- integral storage space
- modern styling and color

Styled in keeping with the dynamics of industry today, each new Torrington Swaging Machine embodies many engineering and design improvements.

Over-all dimensions of dies, backers, rolls and flywheel have been carefully engineered to provide the greatest swaging capacity possible for given machine size and horsepower. Moving parts are made of the finest grade tool steels, hardened and finished by the most advanced methods. Special grade Krupp steel materially improves life of inside rings.

Controls, gatehandle and flywheel guard opening are located on the left side of each machine for easy, natural operation. The new base design allows ready access to power and drive mechanism for easy maintenance.

Scientifically styled to eliminate the distraction of moving parts, the machines also embody improvements that subdue noise.

Whether you are pointing, tapering, reducing or shaping rod or tube, do it the *modern* way by swaging... on a *streamlined* Torrington Rotary Swaging Machine. For complete details, please write.

**THE TORRINGTON COMPANY**

*Swaging Machine Division*

6 North Street, Torrington, Conn.

**See the new streamlined TORRINGTON ROTARY SWAGING MACHINES at Booth 219, ASTE Exposition in Chicago, March 19 to 23.**

| Model Number | Work Diameter Solid* | Tube |
|---|---|---|
| 100 | 1/16 | 1/4 |
| 111 | 1/8 | 5/16 |
| 211 | 3/16 | 1/2 |
| 312 | 3/8 | 7/8 |
| 423 | 5/8 | 1⅛ |
| 1023 | 1 | 1⅛ |
| 434 | ** | 2½ |
| 436 | ** | 2½ |
| 438 | ** | 2½ |

Three light-duty Swaging Machines are available complete with motor and stand containing storage space for dies and tools. New stand design permits operator to sit at his work. These models are also supplied without stand, hood or motor for use as bench machines.

New Streamlined Torrington Swaging Machines are available in any of six heavy-duty models for swaging of larger size solid and tubular stock.

* Solid diameter capacities listed as a general guide only. They can be exceeded depending on type and hardness of material and extent of reduction.

** For capacity on solid work, refer to Torrington Engineering Department.

CIRCLE INFORM-A-GRAM KEY NO. 165


- The representative models of the Rousselle line of punch presses to be exhibited in Booth 1506 include a 15-ton O.B.I., a 25-ton deep throat press, a 40-ton double crank gap press with adjustable bed, and a 15-ton horn press. Service Machine Co., Chicago, promises that still newer models will be on display if time will permit. The No. 4W double crank gap press with adjustable bed handles wide rolls of material easily, is adjustable to press brake operations, and will take two or more dies simultaneously. (S69)

- The Torrington Co., pioneer manufacturer of rotary swaging machines, will introduce a completely new line of machines at Booth 219. Styled for the requirements of modern industry and designed for better operating efficiency, the new swagers offer greater capacity in each general size range. Advances are noted in improved noise control and provisions have been made for a variety of feed attachments. (S70)

- Machine tool conversions using super precision spindles and package units will be the subject of the display in Booth 830. There The Standard Electrical Tool Co., Cincinnati, Ohio will show its many variations to serve the individual needs of industry. (S71)

- An air-hydraulic drill press feed features a new oil-flow principle that adjusts the rate of feed accurately from 2" to 60"/min. This attachment is independent of the working parts of the drill press and doesn't require integration with or alteration of the drill press. It operates continuously through a 4-way Meadmatic valve and 2 miniature limit valves. This press feed will be displayed in Booth 215 by Mead Specialties Co. of Chicago. (S72)

- A new heavy duty floor type Die Filer, developed by Rice Pump & Machine Co., Belgium, Wis., will make its debut at Booth 264. It saws and files to the center of a 26" circle and provides 6" clearance beneath the overarm. It has tilting powered arbor, permitting the operator to work on a level table, variable speeds from 80 to 350 strokes per min, and variable strokes from 0 to 5", all in infinite variations. Overarms are power actuated, qualifying the machine for the larger precision filing and sawing operations. (S73)

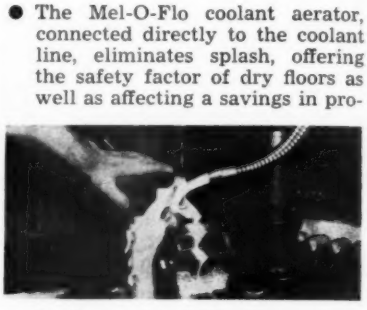
## TOOL SHOW PREVIEWS

- A "Junior" hydraulic marking machine, providing all the functions of the large machines for normal marking operations requiring up to 8,000 lbs pressure and maximum lettering height of 3½", will be featured by Geo. T. Schmidt, Inc. of Chicago at Booth 1131. It is built with a heavy die slide and has simplified controls. The firm's Model 175 hydraulic marker with stacker feed will also be shown. (S74)

- Electric etchers, a Thermo-Tip soldering tool, and an electric marker are some of the products that will be exhibited by Ideal Industries, Inc., Sycamore, Ill. Others that will be displayed in Booth 659 include a hand type tachometer, demagnetizers, and live centers. (S75)

- A new 12-ton hydraulically operated press brake with 48" bed and ram and a profile bending machine will be shown for the first time at Booth 1000 by O'Neil-Irwin Manufacturing Co., Lake City, Minn. Most important feature of the new Model 18-48 Di-Acro power press brake is the "Stroke Control" for presetting stroke lengths. The profile bender has a special pneumatic floating nose that advances or contracts as the contour shaped forming block revolves on the bending spindle during a forming cycle. Di-Acro brakes, rollers, shears, punch presses, and notchers will also be displayed at Booth 1000. (S76)

- The Mel-O-Flo coolant aerator, connected directly to the coolant line, eliminates splash, offering the safety factor of dry floors as well as affecting a savings in production and tool life. The unit, to be shown at Booth 1009 by Melard Mfg. Corp. of New York City, mixes air with the coolant, resulting in the non-splash action. (S77)



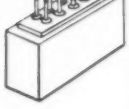
- All types and sizes of vises, rotary tables, angle plates, and milling attachments — the complete Palmgren line—will be exhibited in Booth 262 by Chicago Tool & Engineering Co. of Chicago. Engineering Co. of Chicago. (S78)

- Exhibited in Booth 241 will be Supeream chucking reamers in decimal sizes, produced by Twentieth Century Mfg. Co., Libertyville, Ill. They're available with straight or spiral flutes. All flutes are ground on face and back after heat treatment for smooth reaming, preventing clogging or freezing of chips. Diameters are held to +0.0002 and —0.0000 for close sizing. (S79)

- There will be a number of Syntron vibrating parts feeders operating, handling and orientating small parts at Booth 631. One feeder, for example, will be seen feeding ball bearings to a controlled gravity feed track. The track will be equipped with an escapement device controlled by a timer so that the bearings can be discharged at regular intervals. By means of the timer, the time interval may be changed to either increase or decrease the discharge of the bearings. Syntron Co. is located at Homer City, Pa. (S80)


Here's Everything
for Precision Boring and Internal Threading

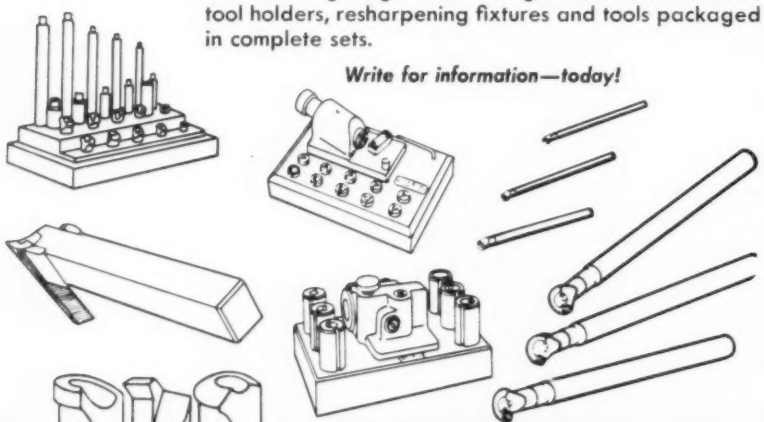
You'll find everything you need at Bokum for fast precision boring.



Due to the unique design—combined radial and helical back-off—Bokum tools provide constant clearance, permit faster machine operation. Resharpening is simple.

Bokum's new products include tools for cutting grooves for retaining rings and O-rings. Accessories include tool holders, resharpening fixtures and tools packaged in complete sets.

*Write for information—today!*



TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL COMPANY, INC.
14775 WILDEMERE AVENUE • DETROIT 38, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 166

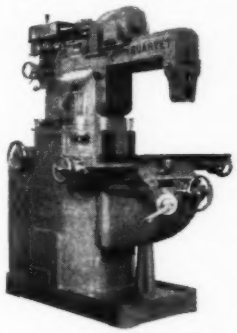
# TOOL SHOW PREVIEWS

- Items ranging from carbide tip planer tools to interchangeable block-type tooling, and including boring heads, boring tools, and tool holders, will be shown at Booth 489 by the Davis Boring Tool Division of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. (S81)

- Two all-aluminum portable toggle clamp models are among the seven De-Sta-Co models to be displayed by Detroit Stamping Co. of Detroit at Booth 752. The new lightweight clamps are especially suitable for overhead applications, for hard-to-get-at places, and in applications where the non-magnetic properties of aluminum are particularly desirable. (S82)

- The complete "finished-after-hardening" line of cutting tools and gages for precision threading made by Hanson-Whitney Co., Div'n of Whitney Chain Co., of Hartford, Conn., will be shown at Booth 163. Featured will be the new concentricity attachments for visual gaging the H-W external and internal thread comparators. (S83)

- Two new milling machines will highlight the display of the U. S. Burke Machine Tool Division, Cincinnati, Ohio in Booth 604. The Quartet (illustrated) is a No. 2 horizontal universal knee type unit for horizontal, universal,



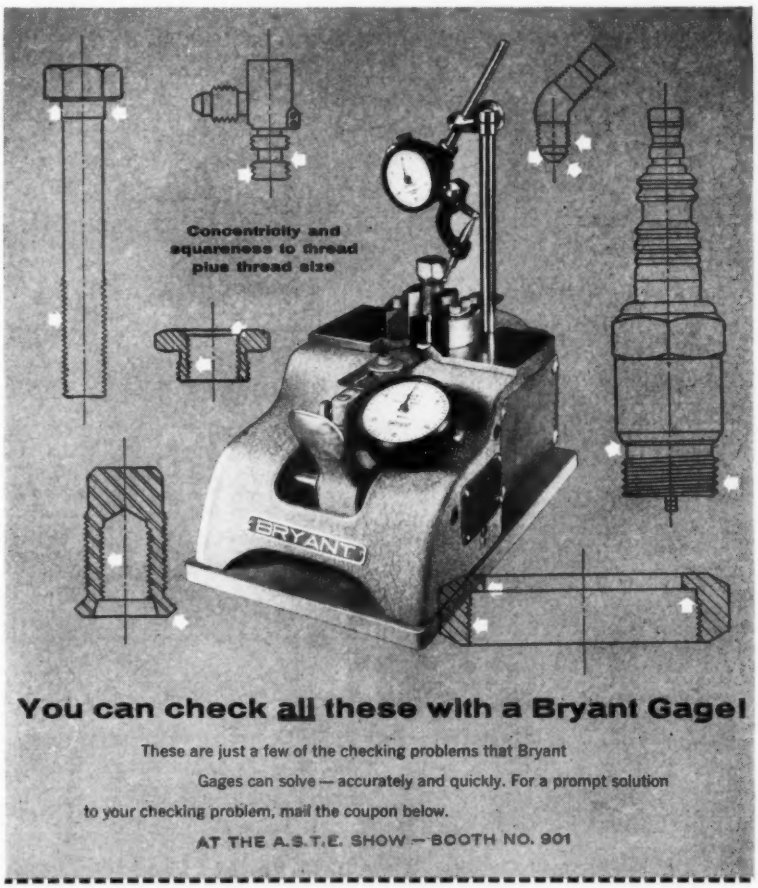
vertical, or angular milling operations. The second machine is the U. S. vertical powerfeed head milling machine. The feed rate of the head is infinitely variable from 0.002" to 0.008" per revolution. (S84)

- A new type of black granite, harder and denser than other granites as well as hardened tool steel, will be previewed as surface plate equipment by The Challenge Machinery Co. of Grand Haven, Mich., at Booth 941. Cast iron top work benches, semi-steel check tables, straight edges, angle plates, box parallels and other toolroom equipment will also be shown. (S85)

- Two blast cleaning machines will be exhibited by Wheelabrator Corp. of Mishawaka, Ind., at Booth 146. The Model 43 Liquamatte is for all sorts of precision cleaning and finishing operations. In cleaning, a slurry of fine mesh abrasive is thrown at the work through a nozzle by means of a compressed air. The Wheelabrator Tumblast does its cleaning by metallic abrasive particles which are hurled by a rotating wheel in the roof of the blasting compartment. (S86)

- "Micro-mite" mandrels are believed to be the first standard line of precision internal chuck type mandrels ever offered for bores between ¼" and ⅜". The miniature expanding mandrels incorporate all of the Count-Centric features, including guaranteed accuracy. They will be featured by Le Count Tool Works, Inc., of Hartford, Conn., at Booth 1107. (S87)

For Additional
TOOL SHOW PREVIEWS
Turn to Page 221
For additional information, Circle Key Number on Inform-A-Gram Card, Page 142.1.

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These are just a few of the checking problems that Bryant Gages can solve — accurately and quickly. For a prompt solution to your checking problem, mail the coupon below.

AT THE A.S.T.E. SHOW — BOOTH NO. 901

Bryant Gage and Spindle Division P. O. Box 620-F Springfield, Vermont, U. S. A.

Gentlemen: ☐ I am enclosing a print of my part. Please send me a quotation. ☐ Please send literature and prices on the complete line of Bryant Gages. ☐ Please have Bryant representative call.

Name Street
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CIRCLE INFORM-A-GRAM KEY NO. 167

## PORTABLE MAGNETIC DRILL PRESS

Accurately drilling holes in large machine bases and similar components entails considerable labor in mounting the workpiece in the drill press or radial drill.

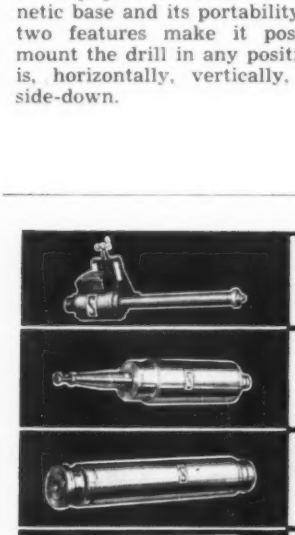
Features incorporated in the Portomag drill press facilitate the drilling of holes in hard-to-handle components. The principle features of this equipment are the electro-magnetic base and its portability. These two features make it possible to mount the drill in any position, that is, horizontally, vertically, or upside-down.

The electro-magnetic power can be adjusted so that the unit can be set up for operation. Sufficient power will remain to hold the weight of the unit against the working surface, yet allow for sufficient movement to position the drill to the punch mark.

After setup adjustments have been made, turning on the full power holds the drill press securely for accurate drilling work.

The Portomag unit, built by Portomag, Inc., 1511 E. Nine Mile Road, Ferndale 20, Michigan, comes equipped with electro-magnetic pull of from 1400 to 1900 lbs and drilling capacities of from ⅝" to 1¼".

A demagnetizing switch makes possible the immediate and effortless removal of the unit from working surfaces.

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ASTE EXPO • CHICAGO • MARCH 19-23

CIRCLE INFORM-A-GRAM KEY NO. 168


## PORTABLE ROUTER TRIMS THICK WING SKINS

Half-inch-thick wing skins on today's high-performance airplanes can not be considered simply as sheet metal. Trimming these skins requires heavy-duty cutting equipment.

Martin Aircraft uses a portable pneumatic hand-router fitted with a ½" milling cutter. An adjustable guide is clamped to the routing head, and is held against the trim-template as the cutting progresses. This tool permits rapid trimming, produces edges equal to a machine finish, is accurate, and minimizes hand filing.

The device was made for company use only.

## Study Completed on Automation and Job Trends

"Automation and Job Trends" discusses the effects that automation will have upon the demand for labor in the coming years. The booklet is a result of a study by the Council for Technological Advancement.

First, consideration is made as to whether automation is evolutionary or revolutionary. Here the stages that automation has gone through are pointed out.

Then the question is asked, "Why automate?" This particular explanation is supported with statistics. In addition, facts are given why the decade ahead, from all appearances, will be a period of both high employment and rapid technological progress.

Although the effects of automation can't be isolated and measured, various points are taken into consideration and evaluated. The study indicates that the importance of economic growth and indirect stimulation to employment can't be overlooked when thinking in terms of job opportunities.

## Necrology

Henry Sahlin, 62, founder of Sahlin Engineering Co., Inc., died recently in Birmingham, Mich. He was best known as the inventor of the "Iron Hand," an automatic unloading machine for metalworking presses.

Albert V. Wilson, for many years a sales engineer with Clemson Bros., Inc., Middletown, N. Y., died at his home in Winchester, Mass.

Frank E. Payne, 72, chairman of the board and co-founder of Crane Packing Co., Chicago, died recently following a long illness.

Howard T. Hallowell, 78, chairman of the board and a founder of Standard Pressed Steel Co., died recently in Jenkintown, Pa.

## New Adjustable Adapters Reduce Tool Setup Time

High holding power, accuracy, quick and easy adjustment, and trouble-free operations are features of a recently developed lock and eject cutting tool adapter.

This adapter is designed for use on multiple-spindle machines doing drilling, tapping, and similar jobs. Scully-Jones and Company, 1901 South Rockwell Street, Chicago 8, Ill., is the developer. User reports indicate that setup time can be reduced as much as 30% by application of these new tools.

Contributing to these qualities is the ingenious Scully-Jones lock and eject mechanism which speeds and simplifies tool changes and minimizes tool pull-out. In order to change a tool, the operator need merely turn the threaded nut to unseat the chuck which grips the cutting tool. When the new tool is in place, the nut is turned to its locking position and there is no need for pounding or excessive torsion to lock the tool in place. The threaded nut is fitted with spanner wrench holes on its outside diameter as well as its face, to speed tool changes.

A new four-slot design lock and eject chuck furnishes four-way gripping action with a true collet effect to hold the cutting tool in place and reduce damage due to pull-out even on deep oil hole drilling on crankshafts. These tools are made with a degree of accuracy which allows cutting tools to run true within .002".

A wide range of sizes of drills, reamers, and taps may be accommodated by simply changing chucks in the lock and eject adapters.

These adjustable adapters are precision tools made from alloy steel carefully hardened for long wear, great torsional strength, and accuracy.

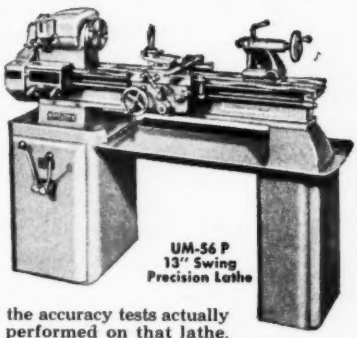

SHELDON Precision LATHES

for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13"... in varying bed lengths with 18" to 48" center distances . . . and . . . in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units—either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, lever-shift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

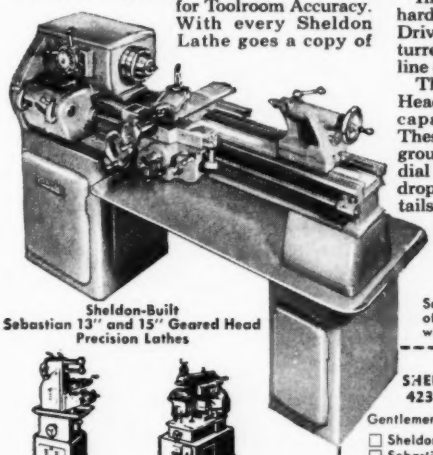
All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed to meet or surpass the American Standards for Toolroom Accuracy. With every Sheldon Lathe goes a copy of the accuracy tests actually performed on that lathe. (19 checks).



UM-56 P 13" Swing Precision Lathe

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrication in the headstock and apron with "1-shot" lubrication of carriage.



Sheldon-Built Sebastian 13" and 15" Geared Head Precision Lathes

SHELDON Horizontal Milling Machine

SHELDON 12" Shaper

SHELDON MACHINE CO., Inc.

*Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.*

4235 N. Knox Avenue • Chicago 41, Ill.

Send in coupon or write for catalogs and names of nearest Sheldon and Sebastian Distributors where you can see these new lathes in operation.

SHELDON MACHINE CO., INC.
4235 North Knox Ave., Chicago 41, Illinois

Gentlemen: Please send new catalogs describing:

☐ Sheldon ☐ 10", ☐ 11' ☐ 13" Lathes
☐ Sebastian 13" and 15' Geared Head Lathes
☐ Horizontal Milling Machine ☐ Name of Local Dealer
☐ Sheldon 12" Shaper ☐ Have representative Call

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Company Name .....

Street Address ..... ☐ Company ☐ Home

City ..... State .....

SEE US AT BOOTH 1240 ASTE SHOW
INTERNATIONAL AMPHITHEATRE, CHICAGO, MARCH 19-23

CIRCLE INFORM-A-GRAM KEY NO. 169

• *New Equipment*
• *New Materials*
• *New Literature*

# WHAT'S NEW

**A New Counterbore** is used for counterboring for a specific size leader pin and the mating size bushing. The positive acting adjusting screws allow fast, easy setting of the cutting edges. Details on the tool are found in an illustrated circular which includes tips to moldmakers. Detroit Mold Engineering Co., 6686 E. McNichols Rd., Detroit 12. **Circle Inform-A-Gram No. E1.**

**Epocast 13** when mixed with an appropriate amount of hardener, will have a pot life of 8 days. For this reason, this fluid epoxy resin is useful for assembly operations where numerous pours are to be made. No amine hardeners are employed and the material is relatively toxic-free. Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, or — **Circle No. E2.**

**There is a difference in end mills . . . MELIN end mills! Proof of this is evident in the continued increase in MELIN popularity. The growth in MELIN tool acceptance was by no means an accident . . . The secret is in *CONSISTENT QUALITY*. This standard of Quality assures you better performance . . . longer lasting performance . . . CONTINUOUSLY . . . from one shipment to another. Next time you order end mills . . . specify the finest . . . specify MELIN.**

**MELIN END MILLS**

**MANUFACTURED IN TWO, THREE AND FOUR FLUTE TYPES.**

***Representatives in principal cities.***

**MELIN TOOL COMPANY, INC.**

**3371 West 140th Street**
**Cleveland 11, Ohio**

CIRCLE INFORM-A-GRAM KEY NO. 170


**A Spray Gun** for plastic epoxy resins has been developed. The "KiPlaGun" features an electrically heated element for maintaining proper spraying temperature, a special nozzle that mixes the material just before it leaves the gun, and a



metering device for positive proportioning of materials. The company reports savings in costs and time when using the gun with "Kiplakote" spray resins. Kish Industries, Inc., 1301 N. Turner St., Lansing, Mich., or — **Circle No. E3.**

**A Brochure on Reynolon Polyvinyl Alcohol Plastic Films** has been issued by Reynolds Metals Co., 2500 S. 3rd St., Louisville, Ky. The publication explains why these films are recommended so highly for use in forming reinforced plastics. In addition, it shows how the plastics can be employed in this work. Also included is complete technical data on the properties and characteristics of the Reynolon PVA films, as well as Reynolon "Reylease", a new mold release parting solution. The films are used for the manufacture of reinforced plastic sections when the part is too large to form in available presses, in the preparation of plastic tooling, etc. **Circle No. E4.**

**An Extra-Thick Cast Acrylic Sheet,** 5" to 10" in thickness, is now being manufactured. It is perfectly clear with no flaws or bubbles and eliminates the need for laminating to get the desired thickness for many applications. Cadillac Plastic and Chemical Co., 15111—2nd Ave., Detroit 3, or — **Circle No. E5.**

**"VacForm" Models 88 and 88-FM** are highlighted in an 8-page folder from Vacuum Forming Corp., 76 S. Bayles Ave., Port Washington, N. Y. Model 88-FM vacuum forming press is adapted for fast, convenient, simultaneous two-way vacuum and drape forming with both male and female molds. The brochure explains the functions of both machines and summarizes the features and uses of these and other units in the VacForm equipment line. Also shown are items manufactured on Model 88-FM. **Circle No. E6.**

# IN PLASTICS?

• *Plastics Fabrication*
• *Plastic Tooling*
• *Plastics Molding*

**A Collection of Metal Forming Bulletins** outlines the manufacture, uses, and advantages of plastic draw dies, stretch press dies, and hydroform dies. The booklet explains the selection of various tooling materials such as casting, coating, laminating, and foam resins, and the methods of heat-curing resins when tools with special properties are required. The section on draw dies details the uses of plastic tools for runs of various duration in forming metals of varying thicknesses. The booklet giving die manufacturing directions is supplied by Marblette Corp., 37-21—30th St., Long Island City 1, N. Y., or — **Circle No. E7.**

**Diamond Coated Steel Tools** are featured in Catalog 55A-DCP from Dia-Chrome Co., 722 S. Verdugo Rd., Glendale 5, Calif. These tools are designed for production operations on reinforced and laminated plastic materials. They insure high speed operation without the use of coolants and give a smooth, clean finished edge. The tools covered in the catalog include saws, slitting and mounted saws, edge planers, multiple edge planers and burrs, and grinding wheels. Each tool is shown, discussed, and its applications noted. **Circle No. E8.**

**This 1956 Catalog of Injection Molding Accessory Plant Equipment** covers tumblers, grinders, ovens, etc. Each piece of equipment is illustrated and its features and specifications listed. In addition, its various applications are discussed.

Also included are mold releases, heating cylinder purgers, gate cutters, platen hole savers, and steel mold clamps and sets, and injection machine nozzles. Copies of the catalog are issued by Injection Molders Supply Co., 3514 Lee Rd., Cleveland 20, or — **Inform-A-Gram No. E9.**

**The PHI Multi 560-Ton Press** with eight 70-ton rams has a maximum opening of 18". Each of its 24½" square platens has cast-in calrod heaters with temperature controls to 600°F. Presses like this can be built with different ram and platen sizes, and number of units. Pasadena Hydraulics, Inc., 279 N. Hill Ave., Pasadena 4, Calif., or — **E10.**

**A Horizontal Plastics Injection Molding Machine** with a 24-oz. capacity gives faster cycles and high plasticizing rates. It incorporates a straight hydraulic mold clamp with an adjustable clamping stroke. A stuffing arrangement increases the maximum shot capacity by about 40%. Watson-Stillman Press Div'n, Farrel-Birmingham Co., Inc., Roselle, N. J., or — **Circle No. E11.**


**Tool Grinders**

**FOR CARBIDES — CAST ALLOYS — HIGH-SPEED STEELS**

**Ex-Cell-O's complete line of tool grinders sharpen single-point tools efficiently and economically. All are double-end models. All use cup-type wheels and have large easy-to-adjust tool rest tables.**

**There's an Ex-Cell-O Grinder to suit the needs of every shop, large or small. For data on Ex-Cell-O's complete Tool Grinder line, write to Detroit, or call your local Ex-Cell-O representative.**

**Style 44-A Ex-Cell-O Precision Carbide Tool Grinder is one of the newest models. With inbuilt motor precision spindles, and ample coolant pressure flow, it does fast work on a wide range of tool sizes.**

**EX-CELL-O CORPORATION**
DETROIT 32, MICHIGAN

55-7

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

CIRCLE INFORM-A-GRAM KEY NO. 171

# Knurl Patterns Accurately Milled on All Materials

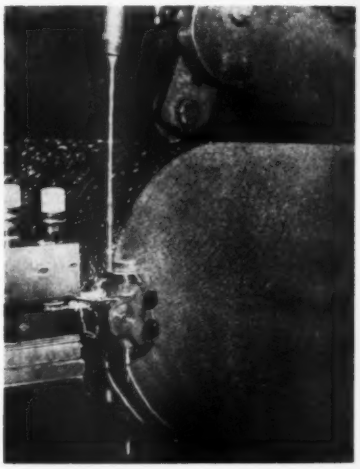
A fresh approach to the accurate production of knurl patterns on all machinable materials is offered in the Alina knurl cutter.

In contrast to the cold-forming techniques formerly utilized, this unique method actually mills the knurl pattern. Disadvantages such as excessive wear on the machine, deformation of parts, and wide variations in the final diameter of the finished knurl no longer need require special consideration.

Rather than rely on heavy pressure to form the pattern, this ingenious device actually cuts the knurl pattern and removes as chips the material formerly displaced by pressure. It therefore becomes possible to generate clean, accurate patterns on virtually all machinable materials, including cast iron, hard rubber, and plastics.

Normally, a liquid coolant must be used to remove the chips from the cutter wheels. However, when the material to be knurled is water soluble, as are some plastics, or tend to become gummy, then an ordinary stream of air may be used to keep the cutter wheels clean.

Because the cutters actually rotate against the work, it is possible to produce a perfect pattern even when 20 to 30% of the teeth have been broken out of the cutters. Manufactured of high-speed steel which Rockwells at 61C, the cutter wheels remain sharp even under severe conditions. Furthermore, the cutters may be inverted on their bearings and the new cutting edge may then be used. An important contributing factor to long life of the cutters is the fact that after both cutting edges have become dull, it is a simple matter to re-sharpen them on an ordinary center type grinder.



The cutter wheels are either milled or ground, depending upon which tool is used. In either case, they may be chosen from a wide range of pitch variations in cross, diamond, or straight patterns.

Because of the unlimited diversity of application and of machines that may be used, the knurling tools are offered by Alina Corporation in 16 different models. Most of these models will cut both the cross and diamond patterns, while others will cut cross, diamond, and straight patterns.

A majority of these knurling tools will handle a wide range of diameters. Some models will handle a work range of 3/16" to 10" dia. The knurling of a 10" diameter roll is shown in the illustration.


POPE PRECISION SPINDLES

Of Special Interest and Value To All TOOL ENGINEERS

See these Spindles at Federal Machinery Sales Co., Booth No. 392, ASTE Show

EXHIBIT A

POPE SUPER-PRECISION, HEAVY DUTY BORING SPINDLES for boring holes round within millionths of an inch. Available in both belt driven and motorized units to meet a wide range of speeds and horsepower. Send us your specifications for quotations.

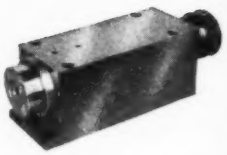


EXHIBIT B

POPE 1 HP, TOTALLY ENCLOSED 3600 RPM MOTORIZED, CARTRIDGE TYPE PRECISION SPINDLES with double row cylindrical roller bearings and separate thrust bearings for no endwise movement of the shaft

EXHIBIT D

POPE HEAVY DUTY, ¾ TO 100 HP DIRECT MOTORIZED SPINDLES for Horizontal or Vertical Skin Milling, Grinding, Milling, Boring and Other Operations

EXHIBIT F

POPE HEAVY DUTY VEE-BELT DRIVEN, PRECISION MILLING SPINDLES, and Wheel Heads, ½ to 50 HP

EXHIBIT G

POPE INTERNAL GRINDING SPINDLES for Bryant, Excello, Heald and Landis Grinders.

EXHIBIT C

NEW POPE QUICK, SELF-REMOVING WHEEL HOLDER for surface grinders and tool and cutter grinders — eliminates the necessity of a wheel puller. Write for quotations.

EXHIBIT E

POPE SUPER-PRECISION MOTORIZED TOOL AND CUTTER GRINDER SPINDLES with clearance Angle Swiveling Heads for Angular Adjustment In A Vertical Plane

EXHIBIT H

POPE SUPER-PRECISION HIGH FREQUENCY HEAVY DUTY GRINDING AND MILLING SPINDLES for speeds up to 100,000 RPM

No. 108

WRITE FOR COMPLETE SPECIFICATIONS, PRICE AND DELIVERY

Specify POPE PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET · HAVERHILL, MASSACHUSETTS

CIRCLE INFORM-A-GRAM KEY NO. 172

*ask the man on the production line . . .*

# "I want P-K® self-tapping screws . . . I make more money with 'em!"

TV production line at Motorola, Inc., Chicago, Illinois

## He does! You do, too!

Pay a man on a unit basis and he wants only the fastener that speeds production and eliminates rejects. That's why P-K Self-tapping Screws are preferred by men on the assembly line. They know through actual use that Parker-Kalon Self-tapping Screws are headed, threaded, pointed and hardened to keep assembly lines trouble-free!

Men in charge of production are P-K boosters, too. They know that the cost of the fastener is a fraction of the cost of using that fastener on the line—that P-K screws are actually the most economical. That's why the men who are responsible for production specify Parker-Kalon. They know . . . if it's P-K, it's O.K.

*Sold Everywhere Through Leading Industrial Distributors. Warehouse In Chicago, Ill.*

**PARKER-KALON® *fasteners***

PARKER-KALON DIVISION • GENERAL AMERICAN TRANSPORTATION CORPORATION • CLIFTON, NEW JERSEY

CIRCLE INFORM-A-GRAM KEY NO. 173

## LATEST AIR GAGE IS 'DEARBORNAIRE'

Formation of a new Air Gaging division to manufacture and market the company's recently developed column-type air gaging instruments and elements is announced by Dearborn Gage Co., 22038 Beech St., Dearborn, Mich.

The new instruments, to be marketed under the trade name, "Dearbornaire," will be offered in three standard amplifications for single or multiple column air gaging applications, and will incorporate several major design and engineering improvements, according to E. E. Ellstrom, Jr., Dearborn president.

Among the new features are a higher rated self-cleaning pressure system, a new improved glass tube design, "zero-centered" calibrated scales, interchangeable component parts, and simplified two-step conversion from one amplification to another. In addition, Ellstrom states, the company's new air gage spindles, snaps, rings, and cartridges will all be applicable to all three amplifications, eliminating the need for using costly single application gaging elements.


Get better cutting and longer life from the standard and special cutters you use every day in production

RO
UNIVERSAL
FORM RELIEVING
FIXTURE

Produces radial or axial relief only or any combination of the two on taps, step drills, profile mills, reamers, etc. Operation has been completely simplified. For maximum versatility use with the R-O Grinder.

*Write for literature*

GRINDER DIVISION
ROYAL OAK TOOL & MACHINE CO.
29800 STEPHENSON HY. ROYAL OAK, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 174


## By-line Briefs:

J. E. G. KLINE has been associated with the honing process since its infancy. In 1928 he was a Consulting Engineer for several manufacturers, including Hutto Engineering Co., who were then designing the first production honing equipment. He was Chief Engineer at Hutto from 1930 to 1937, when he took over as Chief Engineer at Micromatic Hone Corp. There Mr. Kline has risen to Executive Engineer and has been in charge of new developments and patents, Chairman of the Production Processing Committee, and Consulting Engineer.

We are fortunate, indeed, to present DR. W. H. BRANDT'S two-part Report on Soviet Industry. The second part will appear in the April issue. Dr. Brandt, Westinghouse's engineering manager, and two other American automation specialists toured the Soviet Union in December for a view of Russian automation and industry in general. His reactions, as published in TOOLING & PRODUCTION, are taken from his informal reports to other Westinghouse executives.

RICHARD FURMAN was well-versed in the mechanics of single spindle screw machines, having spent over a decade working on them right in the shop. Then a friend's offer sent him looking for a new job so he could learn to handle the intricacies of multiple spindle machines. He did this, returned to his friend's new shop, Standby Products, and is now Superintendent there. His article on the use of carbide tools on automatics is a result of his broad shop experience.

Since 1953, ERNEST J. URBAS has been T & P's Contributing Editor, although his articles in the magazine on automatic and progressive dies date back before that.

T & P is appreciative of the helpful information on Industrial Chicago that was supplied by numerous manufacturers, associations, and agencies. We only wish we had more space to describe more fully the tremendous volume of industry there.

# MOORE

## Presents a Rotary Table Accurate to ±3 sec. in 360°

(USING CHART)

Packaged for protection and convenience

## NO. 2 MOORE 11-INCH ROTARY TABLE

Accurate in horizontal or vertical position

### The following accuracy built for shop use:

All points in 90° increments, from 0, ±1½ sec.
All points in 18° increments, from 0, ±2 sec.
All points in 2° increments, from 0, ±4 sec.

Worm accuracy, ±1 sec.
Repetition of settings, ±1 sec.
*4 sec. = .0001" on 10" dia.*

Write for 8-page, 4-color brochure, of which this is the front cover.

**Moore Special Tool Company, Bridgeport 7, Conn.**

*Builder of the Jig Borer and Jig Grinder*

*If WEAR is a factor...*

*...use*

# VK CARBIDE PLUG GAGES

**TUNGSTEN CARBIDE**
**wire type .016" to .500" diameter**

**CHROME CARBIDE**
**taper insert type .500" to 1.510" diameter**

In addition to its regular line of tungsten carbide wire type plug gages from .016" to .500" diameter, The Van Keuren Company now offers a new line of chrome carbide taper insert plug gages in the range from .500" to 1.510" diameter.

Van Keuren tungsten carbide wire type gages have proved their worth on thousands of tough gaging jobs.

*Trademark of the Carboloy Dept. of General Electric Company.

The new chrome carbide taper inserts (Carboloy, grade #608*) promise to be equally effective. Wearing qualities of chrome carbide are comparable with tungsten carbide. In addition, the material is lighter than tungsten carbide and has a coefficient of expansion close to that of steel . . . both of which factors are a distinct advantage in the larger sizes.

**Finish on Van Keuren gages in either tungsten carbide or chrome carbide will average .5 RMS or better.** These gages are available in Class Y, X, and XX accuracies at moderate prices and on a reasonable delivery basis.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 36 containing valuable technical and engineering information on measuring problems and methods. Address:

VK

37th YEAR

THE Van Keuren CO.,

**171 WALTHAM STREET, WATERTOWN, MASS.**

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . . Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.

CIRCLE INFORM-A-GRAM KEY NO. 176

Metal Carbides Corp. has added two men to its Detroit sales office staff. **Butler Brewen** who will serve as district sales manager, was formerly associated with Sandvik Steel Co. and Vascaloy-Ramet Corp. **Donald Coats** will be a sales representative.

◆

**John E. Newlin, Jr.** will take over as manager of tool steel sales for The Carpenter Steel Co. He joined the company after 15 years with Henry Disston & Sons Co., Inc. Mr. Newlin succeeds **Norman W. Calkins.**

◆

**David W. Bonnar** has been appointed assistant sales manager for Clearing Machine Corp., division of U. S. Industries, Inc. He will be responsible for all sales functions of the company's Hamilton, Ohio, plant and will direct the activities of the entire distributor organization. **Frank Long** will handle the sales of mechanical and hydraulic power presses in Cleveland.

◆

**George Bastian** is the new industry manager — metalworking accounts for Twin Disc Clutch Co. He joined the company in 1944.

◆

**Charles R. Delorme** and **Carl F. Johnson** will take over as sales engineers in the Detroit territory for Colonial Broach & Machine Co. They will service major automotive accounts.

◆

Appointment of **M. J. Taup** as administrative assistant to the vice president-sales has been announced by **F. T. Harrington** of Vickers Inc. Succeeding Mr. Taup as manager of mobile products sales is **A. M. Lane.**

◆

**David G. Matthews** has been promoted to assistant sales manager by Wilton Tool Mfg. Co., Inc. He will fill a position left vacant when **William Ferrick** became sales manager. **Albert Burke** will represent the company in upstate New York.

◆

Two new socket screw field representatives have been appointed by The Bristol Co. **Reginald H. Rose** will be assigned to the Boston office and **L. Robert Steele** will work out of the San Francisco office.

Onsrud Machine Works Inc. has announced the appointment of **Robert M. Miller** as sales manager of the woodworking machinery and the portable tool divisions. He had been associated with John Oster Mfg. Co.

◆

**Joseph S. Geisinger,** field engineer on tool and carbide machining applications in the Detroit area, has been transferred to the Cleveland field engineering staff of Wesson Co. **H. J. Dupuis** has been named to the Detroit field engineering staff.

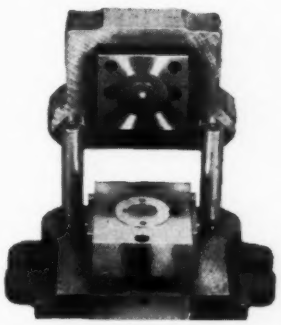
**Mel Conwell** has been named sales engineer for George Sall Metals Co., Inc. He will cover the midwestern territory from his headquarters in Springfield, Ohio

◆

The new general manager of product sales for F. J. Stokes Machine Co. is **Charles V. Nicholson.** He was formerly manager of the international division. He now directs all headquarters sales and marketing activities, both domestic and international, for all of the company's product lines.


"HOVIS WASHER DIES have sure solved our troubles!

"You, too, should make washers the economical Hovis way. Save time, labor, materials and storage space"



Made in 5 sizes:
¾"- 1½"- 2½"- 4"- 6"
Write for Literature

NO NEED TO MAKE A NEW DIE FOR EVERY STAMPED PART

The modern method adopted by manufacturers nationally . . . These *Patented* Dies provide a Master Holder by which, upon simply and quickly removing and replacing Five, Small Interchangeable Parts, a new size washer may be produced . . . Special sets of parts available for use in these units . . . This method makes possible production of irregularly shaped pieces and shallow draws . . . Multi-Washer Dies designed and manufactured.

HOVIS SCREWLOCK COMPANY

8100 E. NINE MILE ROAD VAN DYKE, MICHIGAN
Phone: Slocum 7-4800 Suburb of Detroit

CIRCLE INFORM-A-GRAM KEY NO. 177

# MEN YOU SHOULD KNOW

The election of **J. D. Neuman** as vice president and director of purchases has been announced by Sharon Steel Corp. He joined the company in 1931.

◆

**H. E. Thornton** was named chief engineer of Bound Brook Oil-Less Bearing Co. The announcement was made by **William R. Toeplitz** who, at the same time, was made president of the company.

**Robert Hunt** has been appointed to the expanding research and development staff of Wesson Co. He will assist in tool development and conduct a continuing study of machinability data.

◆

The new manager of Republic Etched Products, Inc. is **William K. Hooper.** The announcement was issued by **John W. Douglas,** company president.


SPECIAL INTRODUCTORY UNIT

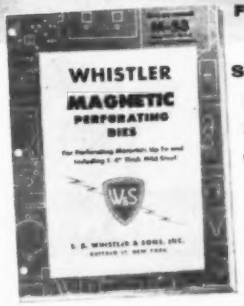
WHISTLER

10 HOLE MAGNETIC PERFORATING DIE

**Cut die costs drastically, start production quicker.** This M-12-14 Complete Introductory Unit includes a set of blank templates, ten punches, dies, strippers and punch and die retainers complete to make up a ten hole precision perforating die. Any diameters from 1/8" to 1/2" to your selection. Catalog illustrates additional re-use economies.

$675 NET F. O. B. OUR PLANT

WHISTLER DIES ARE CUTTING COSTS FROM COAST TO COAST




**SEND FOR CATALOG** Illustration shows how quick and simple it is to set up a Whistler Magnetic Perforating Die ready for production. Larger standard units can be added to suit your requirements.

**S. B. WHISTLER & SONS, INC.**

*Manufacturers of Adjustable, Magnetic and Custom Built Dies for All Industry*

**748 Military Road** **Buffalo 23, New York**

CIRCLE INFORM-A-GRAM KEY NO. 178


**John Gabrenas** will take over as chief engineer for Firth-Loach Metals, Inc., according to an announcement by **L. Gerald Firth.** He was previously with Firth-Sterling Steel Co. as assistant chief engineer. **M. A. Cancelliere** has been elected chairman of the board and **William J. Loach** to the post of executive vice president.

◆

As part of its expansion program and the development of new grades of carbide, **Don M. McPherson** has been made general manager of Willey's Carbide Tool Co.

◆

Nameplate and Monogram Co. has elected **H. E. Grout** as vice president of manufacturing. He had previously been with Westinghouse Electric Corp. for 29 years. **H. S. Steiger has** been named superintendent of tool and manufacturing engineering. He started as an apprentice die maker in 1929 for General Electric Co.

◆

**Dr. James C. Hodge** has been elected a vice president of The Warner & Swasey Co. He will be concerned with the problems of manufacture in the company's Cleveland and New Philadelphia, Ohio, and Lansing, Mich., plants.

◆

**Paul W. Polk** has been named an executive vice president of The Sheffield Corp. He will succeed **John P. Bernard.**

◆

The new works manager of Leece-Neville Co. is **Axel W. Hedberg.** He was formerly plant manager of the electric motor div'n of Hoover Co. **Homer C. Hueffed** will take over as superintendent of the company's Cleveland plant.

◆

Portland Machine Tool Works, Inc. has announced the appointment of **Thomas Pakenham** as general manager. He will be in charge of the machine tool and the heavy machining divisions, as well as the aircraft division.

◆

**William A. Sine, Jr.** has been appointed general supervisor of production material control and procurement for SKF Industries, Inc.

◆

A new company, Sup-R-Die, Inc., has been formed to supply tool and die makers in Ohio, western New York and Pennsylvania, and West Virginia. **Ed Brumagin** will serve as president; **R. H. Gayner,** vice president; and **Bill Goodrich,** plant manager.

# MEN YOU SHOULD KNOW

Two major promotions in the manufacturing division have been made known by **R. W. Parker,** vice president and general manager of Parker Sweeper Co. **Ned Woolums** will assume the position of vice president-manufacturing. **Paul R. Reaver** has been made plant superintendent.

◆

**Desmond S. Chambers** will assume the post of plant metallurgist at the Latrobe steel mill of Vanadium-Alloys Steel Co. He will fill a vacancy created by the promotion of **Charles F. Sawyer** to works manager.

◆

The new chief engineer of the industrial hydraulics division of The Parker Appliance Co. is **Herbert H. Schmiel.** Prior to joining the company, he had been with the Hydreco Division of New York Air Brake Co.

◆

**Harry L. Schultz** has joined the Warco Press sales engineering department of The Federal Machine and Welder Co. He has been associated with the manufacture, design, and application of presses for 20 years. He was previously employed as chief engineer by The Cleveland Punch and Shear Works.

◆

**Robert G. Hess** will become an executive vice president of the Pesco Products Division of Borg-Warner Corp. He was formerly vice president-operations. **Spencer H. Mieras** has been appointed president and general manager of the firm's Warner automotive parts division.

◆

**George Perrault, Jr.** has become a vice president of E. W. Bliss Co. He was manager of the company's Salem, Ohio, rolling mail division. Mr. Perrault joined the company in 1949.

◆

**Sol H. Friedman,** president of Solar Steel Corp., has announced the election of **Samuel W. Solomon** as vice president sales of the Hanover Division.

◆

**Joseph P. Murphy** has been promoted from chief estimator to plant manager of Luria Engineering Co. He has been a structural steel engineer for the past 10 years.

◆

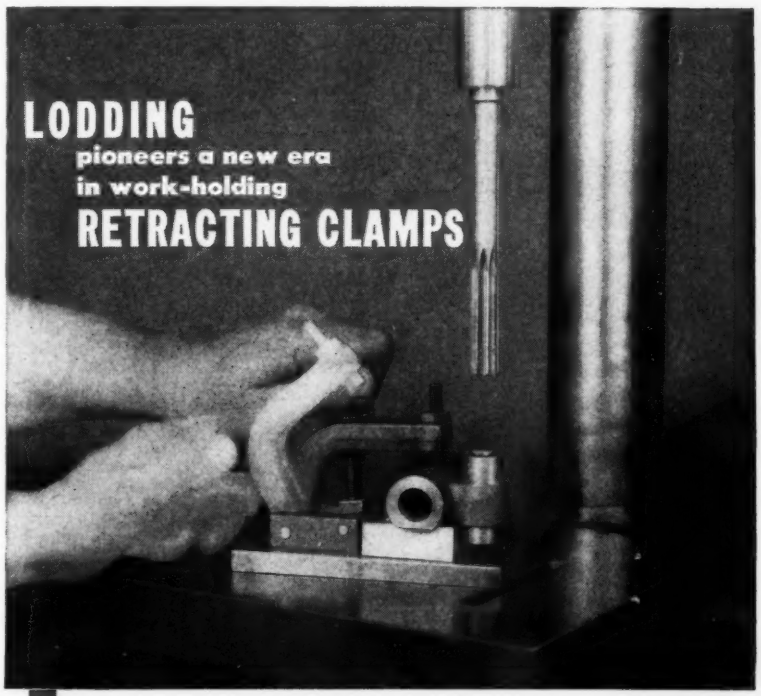
**L. B. Kuhns** and **B. J. Fletcher** have been named assistant chief engineers for Aluminum Co. of America. Both men will continue in their present positions, Mr. Kuhns as chief construction engineer and Mr. Fletcher as chief hydraulic engineer.

**Donald H. Dalbeck** has been elected president of Reed-Prentice Corp. and of Package Machinery Co.

◆

**Lyle W. Blanchard** has become manager of industrial engineering for the Plymouth Division of Chrysler Corp. He will be responsible for all activities related to staff operations pertaining to purchasing, plant engineering, master mechanic, time study, and estimating.

**James O. Wright** will take over as assistant general manager of Ford Division of Ford Motor Co. He formerly was director of purchasing for the company. Mr. Wright is succeeded in this position by **Earl G. Ward.** The new manufacturing manager of the special products division of the company will be **Robert L. Collins.** He was formerly supervisor of the manufacturing engineering services section for Ford Division.


For rapid hand clamping. Quick as a flick of the wrist, a quarter turn of the hand knob, and a natural arm movement brings clamp to work and clamps—another quick movement releases work and retracts clamp. Hand knob (shown), cam, nut or air operated assembly. Four sizes each of four styles.

*Factory Warehouse*
**Precision Tool Sales, 417 E. Florence Ave., Los Angeles 3 — PL 3-3321**
A.S.T.E. Industrial Exposition—Booth 735

**LODDING, Inc.**
**WORCESTER 1, MASS.**
CIRCLE INFORM-A-GRAM KEY NO. 179

# Special Piercing Press Punches Precision Holes

An automatic electric special piercing press has been developed for producing precision pierced holes in stamped blanks. Holes ranging in size from .015 " to 1¾" can be punched on this press in small lot production.

As an example, Figure 1 shows a blank that is economically pierced in small quantities where the size and relative location of the holes must be accurate within ± .001". In this particular case, overall production did not warrant conventional permanent tools; consequently these parts were pierced for hole size and location on the automatic electric piercing presses developed by The Dayton Rogers Mfg. Co., Minneapolis, Minn.

After pilot runs have been made, there is always the chance that on reorders both hole size and relative hole location might be changed. This is an important tooling consideration on experimental short runs. Such changes are easily made with this piercing method.

**Fig. 1. Typical stamping in which five holes of four different diameters are punched on a short run setup.**

In setting up this job, a piercing plate or piercing jig fixture was provided such as shown in Figure 2. This plate was ¼" thick, in which holes, corresponding in size and location to those to be punched in the workpiece blank, were jig bored. Three pins were provided in the plate to serve for locating the workpiece on the plate.

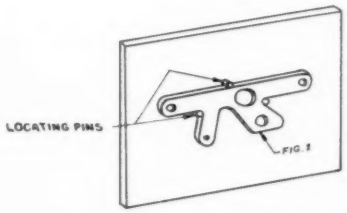



**Fig. 2. Piercing jig fixture showing workpiece mounted in place for punching. The jig fixture has been jig bored with holes to correspond in size and location with those required in the workpiece.**

In the punching operation for this job, the workpiece is located in the jig and both inserted into the press with the workpiece held on the underside of the jig by the operator as shown in Figure 3. As this assembly is placed in the press, it is located for punching by inserting the punch in the corresponding size hole in the jig. As can be seen in Figure 3a the punch extends below the stripper plate G, so that this is easily accomplished.

As soon as the punch is located in the jig hole, contact is made with stripper plate G. This contact action automatically closes the electric circuit which magnetizes the stripper G, and starts the upward action of the press ram EFH to complete its work cycle, as shown in Figure 3b. The operator releases his hold on the jig during the work cycle.

The magnet stripper G holds both the piercing jig fixture B and the piece part in working position during the work cycle. The current is then automatically cut off at the completion of the work cycle, thus releasing both the piercing plate B and the workpiece. The combination magnet and stripper G sheds or strips the blank and jig off the punch D by use of the controlled pressure pins J. The punch D remains in a stationary position and does not

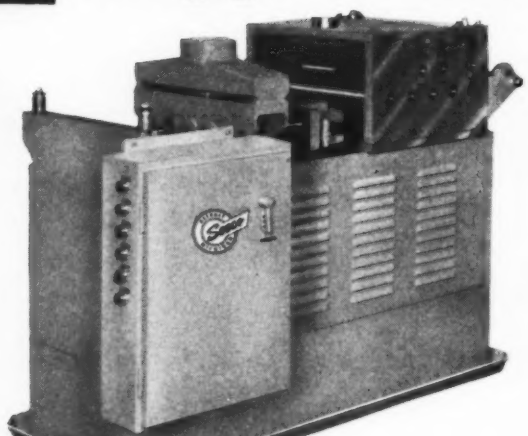
Sesco Punch Press Gripper Feed

AMAZING ACCURACY

ELIMINATES MISFEEDING

INCREASES PRODUCTION

PINCH GRIPPING ASSURES SCUFF-FREE FEEDING



May be attached to your new or present equipment without alteration or re-work of your punch presses. The unit is adaptable to feed from the left, right, front or back. All of the feeding takes place on the upstroke of the press. Models are available to handle stock up to 48" in width and 36" in stroke. This Unit is positive, accurate and reliable.

For Complete Pressroom Automation

Write for Catalog

Sesco INC. 8881 Central Detroit 4, Mich.

engineers & manufacturers of machine tools and press room equipment

CIRCLE INFORM-A-GRAM KEY NO. 180

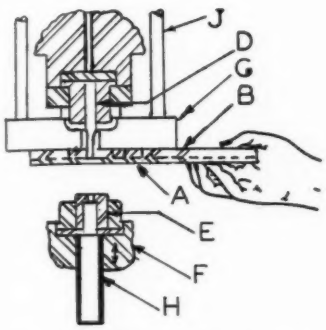
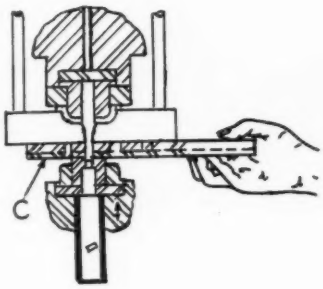



**Fig. 3. The manner of loading the press with the jig and workpiece assembly is shown in 3a. The view in 3b shows the ram in the punching position.**




move but the piercing die E is carried on the reciprocating ram of the press.

Inasmuch as there are holes of four different sizes in this particular workpiece and only one sized hole can be punched on a press, this job would require that four presses be set up, as shown in Figure 4, to punch the holes of four different sizes. On any particular job, it will require as many presses as there are different size holes.

As the work cycle of the press is fully automatic, and allows the machine to run at its maximum speed, carrying from 200 to 300 strokes per min, the maximum work records on these presses are determined by handling time only, derived from placing the fixture and piece part in working position. The work cycle of the press is the smallest part of the time consumed in the piercing of holes in a given piece part.

Holes to be pierced in various stampings can be handled in thicknesses from .005" to 3/16" thick in a satisfactory manner. It is not uncommon to have as many as six presses arranged in a semi-circle, each press piercing a different size hole in a given stamped part.

This piercing operation has proved most economical for piercing holes in various stampings wherein a limited quantity of stampings, of 1,000 to 3,000 per year, is required

In the production of pilot runs, where there is always the possibility of changing the size and location of holes, these presses are provided with punches and dies varying in diameter by .001" in the smaller sizes, and .003" in the larger sizes, thus giving a full universal range of precision pierced holes in the production of stampings in small lots.

**Fig. 4. Four presses are shown in use punching the required four holes of different diameter. Each press punches a hole of a specified size. Since there are five holes of four different diameters, four presses are required.**


New
ARMSTRONG
Armide CARBIDE INSERT
TOOL HOLDERS

Embody...Convenience, Economy Simplicity and Strength based on these superior features:

- IMPROVED CLAMPING METHOD — speeds indexing of Inserts.
- REPLACEABLE SEAT of Hardened Tool Steel — protects shank and provides flat base to prevent damage to inserts as they are clamped in position.
- SHANK of Heat Treated Alloy Steel — gives extra strength and rigidity.

A slight turn of a single screw permits rapid indexing of the ARMIDE insert — reducing down time to a minimum.

The use of ARMIDE "throw away" inserts provides the economy of multiedged inserts — triangular inserts have six, square inserts eight cutting edges. These are available in Utility or Precision finish and in three grades of ARMIDE: 350, 370 or 883.

Protection to the shank is given by the replaceable tool steel seat which prevents wear and damage to the shank and provides a flat base for the insert reducing the possibility of damage to the insert as it is clamped in place. A relief groove is ground into the seat providing clearance when a dulled insert with "built up" edges is turned over.

ARMSTRONG ARMIDE Carbide Insert Tool Holders are furnished in two styles and three sizes. Complete data on these tools is given in Bulletin CIT, mailed on request.

Buy ARMSTRONG TOOLS from your Industrial Distributor

*Write for catalog*

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"

5220 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

See us at Booth 800 A.S.T.E. Show, International Amphitheatre, Chicago, March 19-23

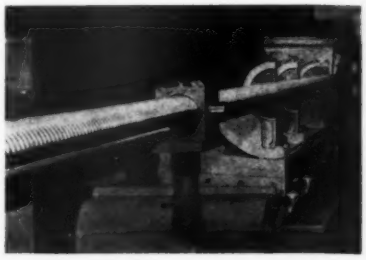
CIRCLE INFORM-A-GRAM KEY NO. 181

## 40′ Screw Thread Finish Ground on One Huge Machine

Finish grinding a screw thread 40′ long from solid steel stock was the unusual job recently accomplished on an Ex-Cell-O Style 120 Precision Thread Grinder. This "king-size" thread — 3½" in dia with a .750" lead — is a gothic-type radius form designed for use with an antifriction circulating ball nut. Extra-long screws of this kind are widely used for actuator mechanisms in aircraft and in special machine tools.

While this 40′ screw length is exceptional, no unusual problems were encountered in the setup or in the actual grinding operation. The Ex-Cell-O machine handles such long workpieces through a large hollow spindle. Four steady rests were used on the machine table, with independently mounted rests beyond the table ends. Thus spaced, these rests prevented the long workpiece from sagging and whipping as it rotated. To protect thread already ground, when the ground section extended beyond the machine, an antifriction ball nut support was used.

Three sections, each 8′ long, were first ground from rough to finish. Following this sequence the part was turned end-for-end and the two remaining thread sections were ground to complete the job. Normally, 10′ of thread can be ground in one setting. Threads longer than that are ground a section at a time, the lead being picked up and continued accurately.



**Here's how one end of the big "forty-footer" appeared during grinding.**

A wide variety of thread grinding is made possible through use of the machine. Thread leads are changed by selecting and positioning change gears in the work head. A lever governs changes from right to left-hand threads.

The thread forms are determined by the dresser, a variety of which are available from Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32.

Feed to finish size, dressing the grinding wheel, work size compensation, and resumption of the grinding cycle after dressing are all automatic functions. Similarly, automatic controls compensate for backlash, regulate coolant and lubrication flow, and retract the grinding wheel at the end of the cycle.

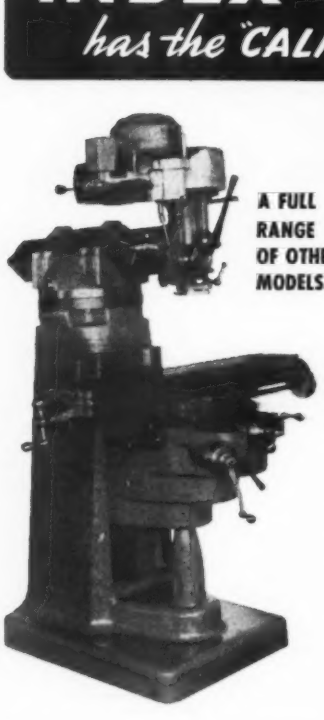
## Unusual Tooling for Finishing Combination Parts

Work on both metals and hard rubber is successfully combined by wet cell battery manufacturers in finishing cell covers which have phenolic bodies with lead terminal inserts.

The machines being used are Bodine 42-30 dial type automatics equipped with 12-station dial feeds. Each of the Bodine units now in production requires but one attendant and combines operations which had previously required five separate machines and as many operators.

The operator hand loads the rough covers into the dial nests; all other

LIKE A "45" AUTOMATIC
this NEW "45" INDEX MILL
has the "CALIBER" and "ACCURACY"
to do your MILLING, DRILLING and BORING JOBS
.. BETTER, FASTER AND MORE ECONOMICALLY!



A FULL RANGE OF OTHER MODELS.

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features. *Write for Literature.*

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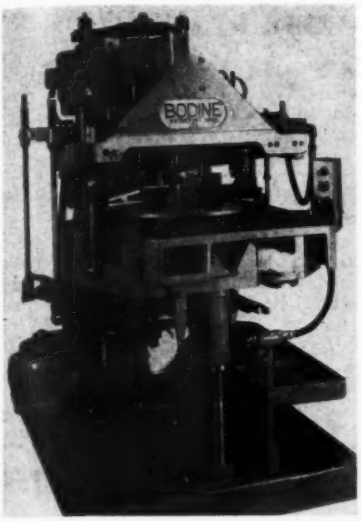



operations are completely automatic. At the first station flash is trimmed from the vent hole and slots, and at the second station the flash is removed from the outside edges of the cover. At the third and fourth stations terminal holes are reamed in the lead inserts at either end of the piece. Hollow milling is performed at the fifth and sixth stations to finish the terminal holes, and at the seventh station the finished cell covers are automatically rejected.

A cover is completed at each stroke of the machine which delivers 25 strokes per min. Production for a single machine is 1250 pcs per 50-min hour. The machines are equipped with multiple tooling so that they can be used for various sized covers for both 6 and 12-volt batteries.

## Carbides Remove Metal Fast in Milling a Casting

A metal removal speed in excess of 93 cu. in. per min. is being obtained on this Cincinnati Hypro boring mill which employs a heavy duty Kendex tool with a Grade K21 turnover carbide insert to rough turn an eccentric cast steel gear.

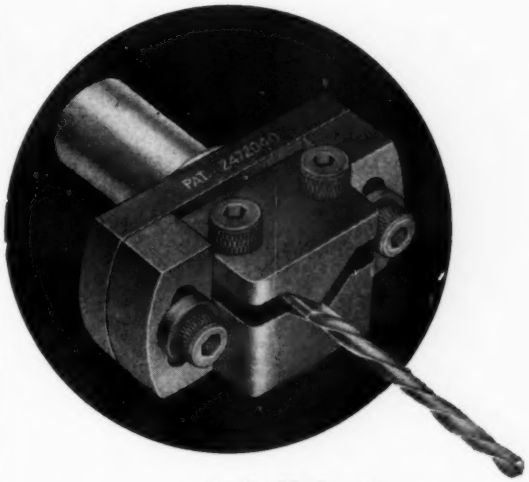
This metalworking task was considered rugged steel cutting by a manufacturer of heavy machine tool equipment.

The 72" x 8½" gear had severe sand inclusions and torch-cut casting gates. Such irregularities on the outside diameter made it necessary to remove from 2½" to 3½" of steel in machining to finish size.

Two rough cuts were made with the Kendex inserts before it was indexed to a new cutting edge. Since four cutting points are available on each side of the Grade K21 insert—two turning and two facing — 16 roughing cuts were made. The insert was then replaced, eliminating expensive regrinding.

Despite the extremely uneven surface of the steel gear, the manufacturer reports that the rough turning of its circumference was achieved economically and efficiently. The sfpm is reported as 300; feed, 0.062 ipr; and depth of cut, ½".

Grade K21, produced by Kennametal Inc., Latrobe, Pa., has high edge strength, a combined resistance to edge wear and cratering, and a high hardness with resistance to breakage. These attributes, plus a clamped tool design free from brazing strains, help reduce downtime on heavy steel roughing jobs.

in half the time

**Brookfield Tool Holders**

make tool set-ups easy!

Now, without bushings or collets, on the first try you can set up drills, counterbores, reamers or cutters for almost any machining operation. Precision ground V-jaw vises, Brookfield Tool Holders make even toughest set-ups a cinch. With one wrench, insert the tool, tighten the jaw, then float the tool into dead center position and tighten. It's as easy as that!

**FREE!** *Descriptive illustrated brochure, plus price and specification lists.*

**BROOKFIELD, INCORPORATED**

STOUGHTON 115, MASSACHUSETTS

CIRCLE INFORM-A-GRAM KEY NO. 183

# MODERN PRODUCTION CONTROL PROCEDURES

*by Donald H. Sunderlin*
SUNDERLIN ORGANIZATION
Consulting Management Engineers
Cleveland, Ohio

GETTING THE RIGHT QUANTITY, of the right things, at the right time, is always difficult. Better planning by your suppliers might ease the situation but a more effective control of production in your own plant, if it is needed, will make the best of this unsatisfactory condition.

Production planning, scheduling, and inventory control problems are often complicated by job orders which cannot be anticipated. The more complex these situations are, the more important good control becomes to customer relations and profits.

### Organization Structure Varies with Conditions

For good control the internal relationships should be tailored to suit each company's individual conditions. Thus we usually find the production control staff a separate entity in large companies but combined with purchasing or several production engineering services in the smaller ones. Because production planning is generally considered as an aid to production, it most often reports to the works manager who is responsible for what is to be made, when, how much, the quality, and the cost of production.

Individual conditions also dictate where the large number of immediate decisions should be made. Recognition of the law of diminishing return determines the best balance between comprehensive control on the one hand, and a free wheeling shop, on the other. Planning is cheaper, because it is less cumbersome, when the final details can be left to the foremen. More flexibility at their level is reflected in lower product costs, too.

It is more convenient because of their inter-related functions when production planning, wage standards, methods, and tooling are located close together although each function may be headed up by a different person.

### Taking the Blue Sky Out of Production

Control of production is obtained by first establishing high, but attainable, standards of accomplishment and then comparing actual performance with those goals to disclose deviations and the reasons for them.

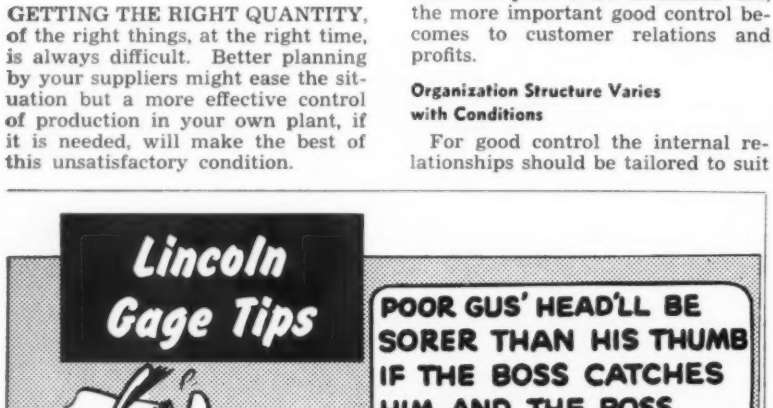
The production schedule provides a standard of performance; but, before it can be set up, machine loading may be necessary to determine what can actually be done. Tool control and material control are used, when needed, to guarantee that the dies, jigs, fixtures, gages, cutting tools, etc. and the materials of which the product is made, will be on hand when needed.

Constant comparison of the actual daily performance of the shop with the production schedule enables the planners to re-plot the course to avoid, or minimize, the effect of actual or impending production roadblocks.

Analysis of the departures from the various schedules reveals the causes and then their recurrence can be prevented. Deviations are caused by the failure of some operators to meet their output standards, breakdown of key machinery, delay in receipt of materials, rejects, etc.

### Planning Tools

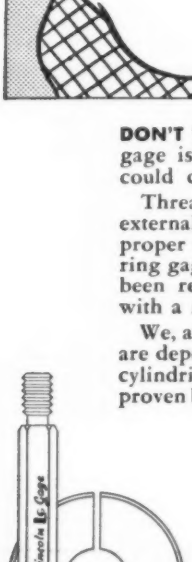
In some plants planning has been developed to a degree unjustified by the results. Again, good management stops at the optimal point in the adoption of procedures, forms,


Lincoln Gage Tips
POOR GUS' HEAD'LL BE SORER THAN HIS THUMB IF THE BOSS CATCHES HIM, AND THE BOSS WON'T USE THAT RING GAGE NEITHER.

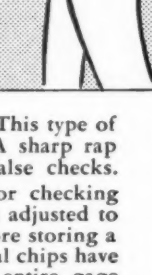
**DON'T TAP or HAMMER WITH A RING GAGE!** This type of gage is very delicate and difficult to adjust. A sharp rap could change the adjustment, thus causing false checks.

Thread ring gages should be used only for checking external threaded parts. A ring gage is always adjusted to proper size by means of a master set plug. Before storing a ring gage, make sure all moisture, dirt and metal chips have been removed from threads, then cover the entire gage with a rust preventative and moisture-proof coating.

We, at Lincoln Gage, are forever aware that our customers are depending upon us to supply ultra precision thread and cylindrical gages as specified. We do it . . . a fact that is proven by the steadily growing number of satisfied customers.




**Write today for 20 page catalog. Fully illustrates our complete gage line and contains easily read thread standards.**



**LINCOLN GAGE CO.**
**23900 HARPER AVE., ST. CLAIR SHORES, MICH.**

CIRCLE INFORM-A-GRAM KEY NO. 184

records, charts, files, scheduling boards, and the other tools, and techniques of production control. The simplest are often harder to develop but are usually the best.

The systems people have developed some new uses for their products which take much of the spade work out of the planning procedure.

I.B.M. equipment quickly accumulates the load ahead of each machine group or individual machine. The cards also help the foremen to plan assignments and after the work has been done, they can be used for keeping the status record up-to-date. Remington Rand has developed long pockets with clear plastic edgings to provide a graphic record. The part number, and the hours each job will require are designated on tape sections which, in total, indicate the load ahead of each machine.

Their Kardex files are convenient for recording the progress of each job through the shop when hundreds of operations are in work at one time.

McCaskey clip boards are a good substitute for Kardex when the operations are few in number.

**Reconnaissance in the Factory**

A critical need of production and inventory control is fast, frequent and dependable liaison between the shop and the production office. In the army, a command is not considered complete until the officer who gave it has made sure that it was executed. Similarly, the production control department must know what is, and what is not, being done as planned.

It has been found practical in many cases to institute the function of "stock chasing", or expediting. The stock chaser, working out of the production control department, speeds up the lagging items by taking appropriate actions. For example, he may split an order to get some of the parts moving before the whole lot is completed. By keeping in close touch with the shortages and the items behind schedule, the emphasis can be shifted to bring about the best overall results.

**Economies**

A large element of judgment is necessary in the preparation of schedules to secure economic operation. It may be found, for instance, that several shop orders can be grouped or that certain customers' future requirements can be anticipated to permit larger lot sizes and consequently a lower set-up cost per piece. This requires a knowledge of the customers' requirements and whether the ensuing delay in delivery will be tolerated. However, it creates new problems: How big a stock should be carried; will obsolescence make the parts valueless; how should the surplus be costed and priced; is the storage space worth more for other purposes?

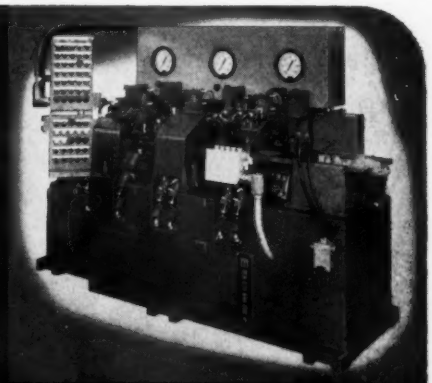
Economies are also effected by reducing established lot sizes when the extra set-up costs are more than offset by storage costs, capital investment, interest charges, and lack of flexibility. With such diverse decisions to be made constantly, production planning requires judgment and knowledge of a high order.

In a nut shell, an effective control of production is one of the best ways of cementing customer relations and increasing profits; delivery as promised satisfies your customers, and more efficient plant operation decreases your costs.

———•———

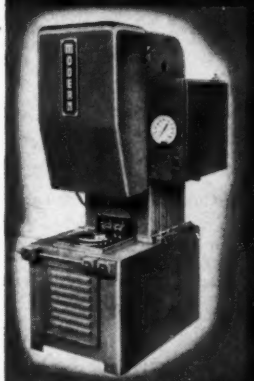
***"Pressure On Metalworking Production" is a 16mm sound movie that's available on a free-loan basis from Lake Erie Engineering Corp., Box 68, Kenmore Station, Buffalo 17. This film demonstrates how hydraulic presses have sparked the new technique of forcing metal into a desired shape rather than removing the metal by machining.***


Production Pressure Test for AUTOMOTIVE AIRCRAFT APPLIANCE and FARM EQUIPMENT Industries



Transfer unit checks 133 manifolds per hour

Here are a few features of Modern pressure test units now in service:



Model MPT-1 unit for transmission converter housings

- Fully automatic transfer line operation testing three separate manifold passages including marking of O.K. parts. Defectives are automatically color coded to show reason for rejection and shuttled to rework station.
- Semi-automatic checking of transmission converter and end housings including stamping of O.K. parts. Production up to 58 parts per hour.
- Semi-automatic inspection of cylinder heads including automatic "dunking" of defective parts to locate leaks.

Ask for literature describing Modern's pressure test units.

14230 BIRWOOD AVE. MODERN® Industrial Engineering Co. DETROIT 38, MICHIGAN

See Modern's Burr-Masters in action at the ASTE Show-BOOTH 613

CIRCLE INFORM-A-GRAM KEY NO. 185

# When a Coolant is a Lubricant

*by Frank M. Aldridge*
President and General Manager
ALDRIDGE INDUSTRIAL OILS, INC.
Cleveland, Ohio

DURING WORLD WAR I, I was not interested in cutting oils. In fact, cleaning the oil off of a Springfield rifle in a training camp was such a tough job that I would have sworn I would never be in the oil business.

Times change, however. I remember some years later, how one lathe hand at a truck plant was very suspicious of the sulphur in our cutting oil. "Will I break out? Will it make my skin sore?" When I told him it had not had a bad effect on the skin of any user, he could not believe it. "I never will use an oil with sulphur in it", he proclaimed.

I finally got the story from him. World War I was the first mechanized war the world had known. Compared with today's equipment those machines were crude and not too dependable. We won the war with tanks, trucks, autos, planes, gun carriers, and too many other pieces of motorized equipment to enumerate.

As usual Uncle Sam did not pick the fight. We were not prepared. But we had to start equipping our armies, and our allies, overnight.

Someone had found out that adding sulphur to cutting oil made it do a better job. Tools lasted longer. Machines could be run faster. Work had a better finish and was held to closer tolerances. Alloy steels could be machined. And it was felt that if a little sulphur was good — lots was better.

So in the plant where my friend operated a lathe, and in thousands of others, buckets of sulphur were placed where they would be handy. Everybody put as much as they wanted in their machines. Many workmen had sores break out on their skin because of the unguided use of sulphur. But in spite of personal difficulties, a great truth was proven.

Greater load carrying capacity can be given to cutting lubricants or coolants, by research, trial and error.

In spite of some of the long-hair papers that we have all heard and read, trial and error are two of the best researchers when it comes to making better coolants.

I presume that the word coolant was first coined to describe a water soluble or emulsifiable oil. Water is the best coolant there is. With the ordinary soluble oil, water alone can do most of the cutting jobs. The oil adds little if anything to making the cutting work any easier. The soluble oil provides a rust preventive to protect the workpiece when the job is done.

The cheapness of the oil is the main reason why so many firms buy the common soluble oil. It does prevent rust, makes a stable emulsion, and it seldom turns rancid even when debris from lunches is tossed into the sumps.

Remember the feeling before World War I. A straight mineral oil was considered all that was necessary in machining steels. Oil is oil. But some of the independent thinkers in the industrial oil field felt that oil alone was not the answer to cutting better steels faster, so they experimented with sulphur, sperm oil, and other additives.

We have found that it is not necessary to be satisfied with the ordinary soluble oil, which has little if any lubricity, and is mainly a temporary in-shop rust preventive.

Why not, we asked, combine the cooling qualities of water with the extreme pressure and heavy load carrying capacity of a top quality, sulphurized, chlorinated, fatty cutting oil? Would not the work be held to closer tolerances? Should not high production at less cost result?

IMITATION is FLATTERING

...but it doesn't give YOU all the advantages of

Buck® AJUST-TRU CHUCKS

The Buck is the *original precision scroll chuck*, and the 6-jaw design was truly revolutionary.

It has been so successful others have copied its appearance and attempted to copy its performance. As might be expected the substitutes don't measure up to the original Buck.

It means that 6 jaws are no longer the distinguishing hallmark of the Buck. You have to look *twice*, when you buy, to make sure you are getting a Buck to get the maximum savings in costly machinists' time plus the construction that guarantees long accurate service. Your Buck distributor will gladly point out the Buck advantages. Catalog gladly sent on request.

**How To Make Sure It's A Buck Chuck**

Most Buck chucks carry a nameplate reading "Ajust-Tru." An even more distinguishing feature are the 12 cap screws that hold the chuck and the chuck adapter together. These 12 large screws are also an indication of the durable, rugged construction of the Buck. Keep them in mind when you buy.

Buck chucks come in 6, 3, and 2 jaws—adaptable to lathes, grinders, dividing heads, and screw machines. Sizes from 4" to 9".

BUCK TOOL COMPANY
318 SCHIPPERS LANE, KALAMAZOO, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 186

We realized that the combination would have to be made so that copper and brass would not be discolored. It would also have to be stable, although we would have to ask shops to refrain from throwing foreign materials into the sumps. The machine should be cleaned thoroughly whenever the soluble oil is changed.

To make anything brand new takes time, even for experienced people. Research and laboratory experimenting are essential, but trial and error with a few years of Father Time's assistance also played a big part in helping us reach our objective.

Consequently, we have worked out an extreme pressure soluble oil with lubricity and high load carrying capacity, which does a wide variety of jobs.

It even does many jobs which formerly required sulphurized cutting oil. Yet it can be used on any metal and will protect it from corrosion or staining.

The extreme pressure soluble oil is very economical. On most work it is used in emulsions at strengths of only one to five percent. It makes a very low cost cutting compound, lubricant, coolant, or whatever you want to call it. Here are some examples of what it does:

In emulsions using only two to three percent Kelkut 202 EP soluble oil in water, all types of machining work is being handled. This includes milling, drilling, broaching, boring, gear cutting, and abrasive cut-off.

An additional 1% or so is added for tapping, threading, and some of the non-ferrous jobs.

Five to ten percent emulsions of the 202 EP soluble oil handles sawing, while grinding is done with only 1½ to 2% emulsions.

It has been very surprising to see deep drawing jobs with five to twenty percent emulsions. This is proving very successful with brass, aluminum, and light carbon steel jobs. The work and the dies are both well protected from corrosion. Both are much cleaner, as 202 EP has no pigments or other hard-to-remove material.

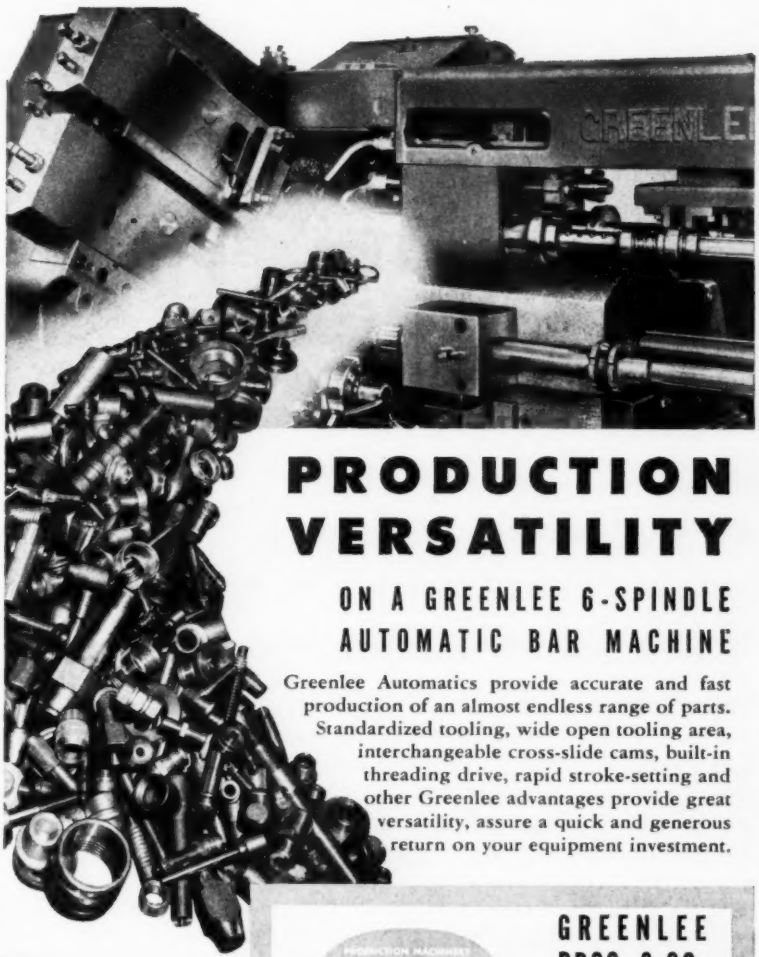
We have observed many trials or tests of different products in large and small plants. Some firms seem destined to operate more efficiently all of the time. Progress is just natural with them. The manager seems to treat a new product with the same consideration and thoughtful guidance that he would give a friend starting his first day in the shop. In this way so much more is gained than in the plants that are indifferent toward new ideas.

We cannot afford to be too busy to try something different. We have to give it the same breaks in our plants that we expect a customer to give a new product of our firm. This calls for a little experimenting or testing by someone who knows what it is all about.

"Hey, Joe, here's another soluble oil. Try it out when you get time." Why waste Joe's time this way? Joe gets paid good wages with many fringe benefits, and he wants to earn them by helping the firm make a profit.

Let Joe in on the project. Tell him what you expect of the new oil. What the reason is for trying it out. How to mix it. On what work it should be tried. What other lubricant to compare it with. And that you want a report from him. In other words, by giving both Joe and the oil a break, you, your shop, and Joe will all profit.

Better alloys, higher precision work, higher production, automation, all add up to a demand for better cutting, grinding and drawing lubricants and coolants. The extreme pressure, high load carrying, soluble oil is the economical answer to so many of the problems that it pays to get fully acquainted with it now.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VERSATILITY
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AUTOMATIC BAR MACHINE
Greenlee Automatics provide accurate and fast production of an almost endless range of parts. Standardized tooling, wide open tooling area, interchangeable cross-slide cams, built-in threading drive, rapid stroke-setting and other Greenlee advantages provide great versatility, assure a quick and generous return on your equipment investment.
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## *Remember This*

## THEN ORDER PARTS

Business is a two-way street, reminds the National Screw Machine Products Association, and the two most important people on it are the buyer and the seller.

With this in mind, the association has compiled some helpful hints for those who specify screw machine parts, so the purchaser can obtain high quality end products at a fair price, and so the supplier can estimate the job accurately and make a legitimate profit. Check these points:

**What About Materials?** Is it to be made of cold drawn or hot rolled? What kind of a finish do you want? What special chemicals or physical or quality extras are required? Must there be magnetic testing or some other kind? Will mill certificates be accepted or do you require laboratory tests? If specifications are to be made by number, viz: Chrysler, Ford, General Motors, or Federal, do you have the specifications?

Will the customer supply the bar stock, and if so, what size and what shape? It should be remembered by the customer that if he is supplying the stock, oversize increases costs. Determine ahead of time what length is best.

The hardness of the material must be considered since excessive softness will result in poor machinability. Where the material supplied is too hard, excessive tool wear is a consequence. Other factors regarding materials are F.O.B. point, the price and delivery costs, responsibility for spoiled material, and weight.

**What of Tolerances and Dimensions?** Do the drawings supplied show all the tolerances required? Are they practical? If any doubt exists with the supplier, he should recheck. Are all the dimensions shown? Do they add up? If concentricity has been specified, within what limits must such concentricity be accomplished? Have these been properly specified? What of break corners and fillets or undercut for grinding?

If the part being ordered is an internal component and is not seen or does not require a special finish, costs can be held down. Here again, seller and buyer should have a clear understanding of what is ultimately to be delivered to the buyer.

**What About Finish?** Are there definite plating instructions and who is to do the plating? What tests are to be performed — salt spray or others? Are there objections to pusher or collet marks and pull-off tool marks? Does the buyer have objections to any discoloration caused by the sulphur-base cutting fluids? Will special handling and special containers be required?

Second operations add to the cost of any item and a clear understanding of what second operations will be involved should be determined. If the buyer is certain as to the required finish of the item, then the seller's cost will be all the more reasonable to him.

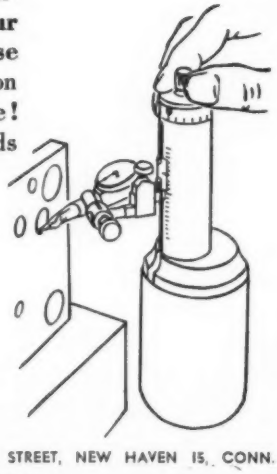
**Inspection and Packing** constitute other cost items. Determination of how these factors are to be handled will save time, effort, and money.

Is the inspection to be made according to the customer's or manufacturer's methods? What is the allowable percentage of defects? What is the acceptable quality level? Are the customer's gages the same as the maker's and who is to furnish the gages? Will extra inspection costs be involved?

When the shipments leave the plant are they to be shipped in kegs, wood boxes, cardboard containers or special containers? Is there to be additional packing to protect threads and sharp edges? Will the customer return the containers if he is so requested?

**with GREIST MICRO-HEIGHT® GAGE**

Precision-built Micro-Height scribes like a vernier height gage...**reads faster than your micrometer!** You read direct from **zero at base** to 3". Hundredths on barrel...thousandths on large-diameter head that **cuts reading time!** Precision ground and lapped Riser extends range to 9".



**CUT INSPECTION TIME!**

Add your dial indicator to quickly read distances between holes, surfaces.

Precision-built, satin-chrome finished Micro-Height Gage quickly pays for itself!

***Call your distributor or write:***

THE GREIST MANUFACTURING COMPANY, 483 BLAKE STREET, NEW HAVEN 15, CONN.

*Precision Products since 1871*

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**More Cost Cutters.** A little thought can cut costs a long way. When buying screw machine products, remember that the more thousands the customer orders, the cheaper each will be.

If the customer is going to provide the bar stock, can he provide enough for a continuous run and is he making any special limitation on over- or under-runs? Is he making a proper allowance for defects that will occur during second operations? According to his orders, must parts be furnished in pairs or matching quantities? Is he making warehouse allowances where the shipments are to be split? Who gets the scrap turnings?

If the part to be made requires complex tooling, can the buyer guarantee enough repeat business to amortize the tooling? Here, the customer has a chance to cooperate with his supplier to hold down his own costs and both parties benefit from the agreement. The customer will find that the supplier's engineering department will cooperate in methods of further reducing the costs.

## NTDMA Forecasts Upturn in Tool and Die Orders

A definite and widespread upturn in orders for special dies, jigs, fixtures, molds, and special machinery was reported at the winter meeting of the National Tool & Die Manufacturers Association at Miami Beach, Fla.

Tooling up for 1957 automobiles, most of which are to be drastically changed for introduction probably late this summer, is the largest single factor in this upturn, the trustees reported. The increasing demand for special tooling, however, results from activity on new models in many other industries, especially in appliance, aircraft, guided missile, electronics, and business machine manufacturing.

Leaders of the contract tool and die industry from tool centers across the country and present for the meeting are looking for a very active first half-year, said Joseph N. Huser, NTDMA president. "Unless unforeseen factors bring a material decline thereafter, they expect 1956 to set a new record in the value of shipments of well over $750-million."

The growing application of automatic manufacturing processes—automation—is bringing with it, he reported, higher requirements for the special tooling that enables the production lines to operate.

Another factor forecasting continued high levels for the special tool and die industry, Huser pointed out, is the sharp upturn in orders for machine tools. To put this new equipment into production, special jigs, fixtures, gages, and dies will be needed.

Guided missiles, the development of which is to receive much greater emphasis from the armed services, are largely still in the development stage, but Harold G. Murdock, secretary of NTDMA and vice president of Arrowsmith Tool & Die Corp. of Los Angeles, where much of the guided missile research is conducted, reports that a considerable volume of tool and die work is already being placed and much more is expected in the near future.

Some Detroit tool and die shops which were closed down last fall for lack of work, NTDMA reports, are now back to normal employment and are already working overtime.


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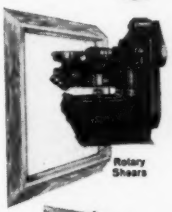


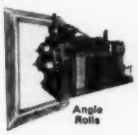

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# PLASTICS RECORD 30% GAIN: LOOK FOR MORE TO COME

Figures on plastic material production for 1955, based on a U. S. Tariff Commission Report, show an increase of approximately 30% over the previous record year of 1954. The plastic industry's growth since World War II has been 5 times greater than normal industry, adds E. P. Moslo, a Cleveland manufacturer of metal and plastic fabricating equipment.

This outstanding growth record is due to numerous factors; among them the development of new plastics, fabricating techniques, and applications by the wide-awake men of the industry.

Today's automobile is an example of the widespread use of plastics in manufacturing. S. A. McElroy of Hercules Powder Co. estimates that today's cars contain an average of at least 10 lbs of plastics. Some applications are obvious, like the arm rests, dome lights and visors, while others, like the plastic battery cases, are not so noticeable. Tools and dies and models made of plastic are enabling car manufacturers to produce their new models more quickly and economically.

Not all applications are in the automotive field, McElroy says. Auto making is big and uses large quantities of varied materials. Some of today's 20-plus available plastics fill their requirements and are used. "The plastic industry, however, is not wholly dependent upon the automotive industry," he reflects.

**New Discoveries**

New plastics and new fabricating methods will continue to extend into the electronics and electric, aviation, construction, packaging and fabrics fields, plastics experts agree.

The steel producers are aware of plastics' possibilities and some steelmakers are now extruding plastic tubing as well as their standard metallic tubing and pipe.

The comparatively new super-polyethylenes, offering an unusual combination of properties, including heat resistance, greater rigidity, excellent low temperature impact strength, high tensile strength, and excellent appearance, are "broadening the entire spectrum of plastics applications," says G. H. Sollenberger of Koppers Co., Inc.

These materials can be processed in standard equipment with little or no modification of usual practice. The super-polyethylenes have similar but even better characteristics than the irradiated polyethylenes that are produced by bombardment with electrons. In addition, the super-polyethylenes are more easily and more economically produced. Uses for them include piping, insulation for electrical wire, and packaging.

As more plastics are developed and more applications are found, industry is going to be forced to investigate thoroughly the machining characteristics of the different materials, commented a manufacturer of parts at the recent 12th Annual Technical Conference of the Society of Plastics Engineers in Cleveland.

**Reasons for Growth**

Plastics' growth did not come by accidentally. It must be attributed to the serious men in the industry who have worked and are working to raise and maintain industry standards, commented Conference Chairman Frank A. Martin. "At the same time these men are finding new and improved uses, techniques, and materials," he added.

Over 2,400 men of the industry—engineers, chemists, owners, and operators from plants employing 3 or 4 to those with thousands on the payrolls—met at the conference to discuss the latest developments in the field of plastics. There they heard about injection molding, extrusion, calendering and coating, and reinforcement techniques; epoxy resins, thermoplastic sheets; irradiat-


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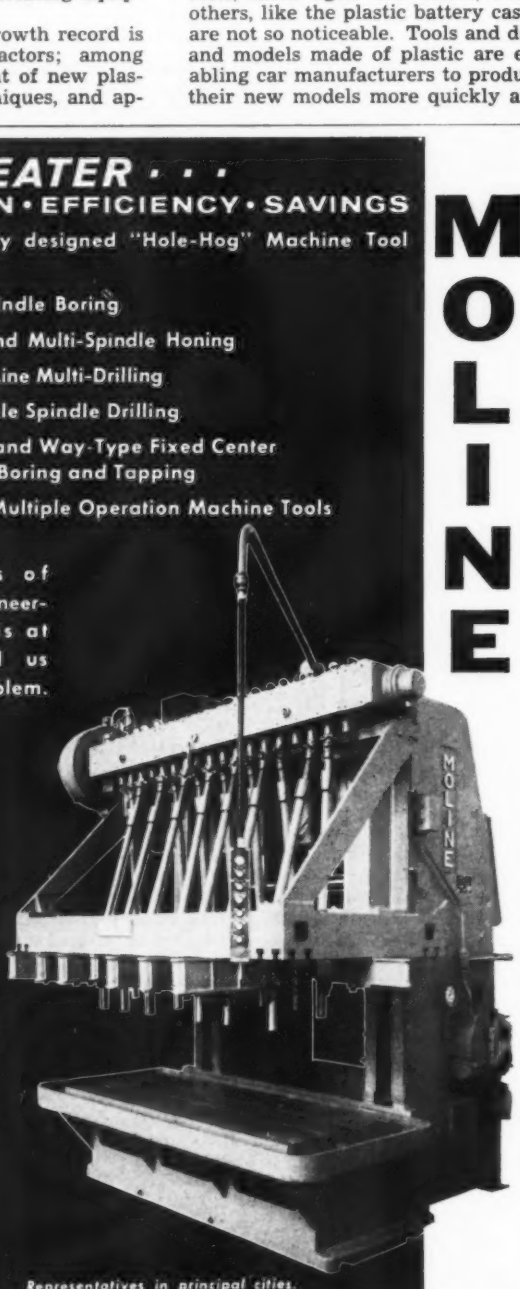


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ed and super-polyethylenes; plastics design; and a myriad of associated subjects.

The Plug Assist Forming Method, discussed at one of the sessions, is a new sheet fabrication technique that widens the scope of both large and small articles when vacuum formed. It borrows features from straight and drape forming methods and adds some of its own, says Dow Chemical's J. W. Mighton. Some advantages of this method are formation of deeper, stronger parts and more uniform thicknesses.

Automation or semi-automation is coming to the plastics field in the form of drape forming equipment that automatically takes the plastic sheet through the necessary drape forming steps, holding quality to a higher standard.

The SPE (Society of Plastics Engineers) draws its 4,700 members from the whole field of plastics on an individual membership basis. Society of the Plastics Industry's members are companies in the field. While not affiliated, the two organizations have worked together to formulate a rigid code of standards for the industry.

It was estimated that 30% of the registrants for the technical conference were non-members of the SPE "looking over what we have to offer in the line of accurate, usable technical information," commented a Committee member. "Add that 30% to SPE's roster and you'll get some idea as to the extent of our industry," he said.

Jerome Formo, research director at Minneapolis-Honeywell, is new president of the SPE, succeeding Frank W. Reinhart, who is chief of the National Bureau of Standards Plastics Laboratory.

## Walter Krieger is President of T & D Institute

Walter Krieger was elected president of the Tool & Die Institute, Chicago association of special tool and die manufacturers, at the recent Annual Meeting of the organization. He succeeds Harry Faust, who was presented with an award for his service to the Institute, at the meeting.

Rolf H. Berg is new vice president and Eugene Weyler, treasurer. Newly-elected directors are Richard C. Berliner, John Filko, and Harold Winzeler. Stan Hill, one of the four retiring directors, was re-elected to serve on the board.

## Two Steel Cutting Carbides Developed by Detroit Firm

Two new carbide grades have been developed by Willey's Carbide Tool Co., Detroit 1, for machining tough steels, alloy steels, and high tensile strength steels.

Series 8-A for roughing cuts and 6-A for finishing cuts, permit 30% higher feed and speed rates in steel cutting operations, the company reports. The new vacuum sintered carbides have greater edge strength coupled with exceptional wear qualities and resistance to cratering, offering outstanding tool performance.

Exhaustive tests in actual production runs show the quality of the metal. In an actual job test performed by a large automotive manufacturer in machining transmission parts, Willey's engineers point out, grade 8-A produced eight times more finished pieces per grind, four more grinds per tool, and cut machine downtime by 200%.


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# Cut Down Noise in Plants and Machine Shops

*by W. Schweisheimer, M.D.*
Rye, New York

THE PROBLEM OF DISTURBING NOISES in a manufacturing plant is getting more serious all the time. Every time industry develops a new machine the noise seems to get worse.

What are the psychological effects of industrial noises on workers?

Dr. R. L. Hanson of the Bell Telephone Laboratories recently made the following statements regarding the problem:

1. Loudness and intensity of noise are not the only things that annoy the worker. In most cases, a machine operator is not disturbed at all by the noise his own machine is making. What does jangle his nerves is the erratic, uncontrolled noise made by other machines at unexpected times.
2. The worker is annoyed most when noises are jumbled together so that the source is unknown.
3. Sound can be measured by scientific instruments, but the ear of the worker determines the real effectiveness of a soundproofing job. Low-frequency noises (below 500 cps) seem to be much less annoying than higher frequencies of the same intensity. Many noise problems can be solved by shifting sound from high to low frequencies as well as by lowering intensities.
4. Age is a big factor in the effects of noisy working conditions. Workers between 25 and 40 years are most likely to be bothered. Those under 25 do not tire so quickly and can adapt to changing conditions more easily. Older workers either have become accustomed to noisy working conditions, or their hearing has been impaired by their jobs or by advanced age.

### Reduction of Machine Noise

The realization that "noise costs money" has come gradually. It first became apparent when claims were made for compensation for hearing loss from working in areas of high noise level. The fact that noisy surroundings reduce efficiency has received less attention.

Wentworth D. Boynton, development engineer of the Western Electric Company, Baltimore, recently has published a study on the reduction of machine noise. The problem is not a simple one because the pattern of machine noise is complex. He described his experiences with the insulated wire shop at Point Breeze. Drop wire, as used by the Bell System, consists of a pair of insulated conductors, over which is applied a textile barrier, which in turn is covered by an extruded neoprene jacket. This textile barrier consisted until recently of a cotton braid, which was applied at a high rate of speed by banks of specially designed braiding machines.

The braiders made a lot of noise. There are several methods of reducing noise level. The first is by installing sound-absorbing material on surrounding walls and ceiling or, in the case of open factory areas, by installing an overhead grid of sound-absorbing panels. This was not a practical solution of the problem.

A second method is to enclose the machine in a sound-absorbing housing. Sometimes, enclosure is the only way that a big reduction of noise can be effected; but, with over a hundred braiders involved, it did not seem to be an economical solution to the problem.

A third way of reducing noise is to get at the source of the noise in the machine itself. This seemed to Mr. Boynton the best approach where possible. The general method of attack is to make a frequency analysis of the noise from the machine with a sound analyzer. The various peaks in the resulting noise

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spectrum can then be associated with some factor in the machine motion.

One can then check one's conclusions by substituting, for example, a v-belt for a chain drive, changing gear pitch without changing ratios, replacing suspicious ball bearings, or disconnecting non-vital parts, making another frequency analysis as each change is made. Several noisy machines were removed by Mr. Boynton from the production line and installed in a warehouse where the noise level was low and the necessary instruments could be set up and left undisturbed.

Eventually it was felt that a large enough reduction of noise had been secured to substantially improve working conditions in the braider area. The cost of closing the head housing, installing a filter on each unit, and providing a blower with duct work for each bank of machines was estimated to be moderate.

#### Quiet Plant—Higher Efficiency

Armour Research Foundation, a division of Illinois Institute of Technology, is well known for its success in quieting machinery and equipment. It analyzes a piece of machinery from a noise standpoint by first finding the noise-making sources and then the components that transmit and amplify the noise. Dr. Howard C. Hardy, supervisor of Armour Research's acoustics and vibrations section, reported an interesting case recently. A manufacturing company, after having quieted down its plant, showed a 9% increase in efficiency, up to 50% reduction in errors, near 50% cut in employee turnover, and 37% drop in absenteeism.

It is not always the actual noise source, such as an electric motor that is the offender. Sometimes the machine itself acts like the sound box on a violin, amplifying the motor noise. In such cases, Dr. Hardy emphasizes, the quieting job can be done quite simply by isolating the motor or gear noise from the rest of the machine. Airborne sound, such as that from a grinding wheel that is not doing any work, usually can be isolated by enclosing the part in a soundproof container.

Carl W. Lemmerman, president of Industrial Sound Control Inc. of Hartford, Conn., in his theory about controlling industrial noises, breaks the "unit absorption" down into four basic elements: sound traps that are used to silence air-transmitted noises from blowers, fans, and the like; portable sound barriers that are used singly, in pairs or sets, and placed around noisy operations such as drilling or chipping; soundproofed rooms with specially built doors and windows, designed to keep noise either in or out; and machinery enclosures that can be placed permanently around three sides of a noisy machine. These not only cut the noise in the plant but reduce it for the operator within the enclosure.

In addition, Lemmerman recommends such installations as soundproofed walls that can be used to block the noise from whole banks of machinery. Costwise, he claims, unit absorption is less expensive for large areas than typical office-type soundproofing.

#### Screening the Workers

Besides making the plant quieter, there is another approach to the noise problem. That is to screen the workers, with the idea of putting those with particularly noise-susceptible ears in quiet parts of the plant.

The American Academy of Ophthalmology and Otolaryngology recommends that an industrial company go through the folowing steps in its screening process of its workers:

1. Determine the noise levels in all parts of the plant.
2. Give pre-employment hearing tests to all workers who are to be stationed in areas where the noise level is over 90 decibels, and give followup tests regularly every month or two.
3. If tests show a worker has noise-susceptible ears, transfer him to a quieter job, or make him wear ear protectors. The latter is recommended although many workers will say: "Why? I can take it."


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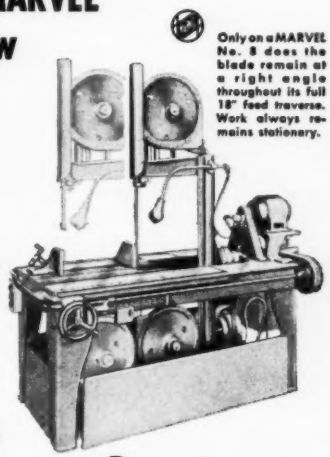
***...only the MARVEL is Universal***



Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.

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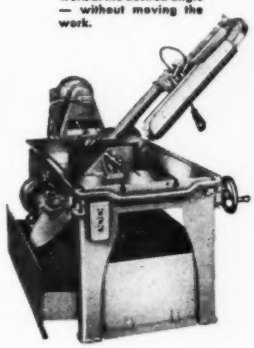

Only a No. 8 MARVEL can do all of these things: Snip-off a ½" rod or cut-off an 18" x 18" cross section.

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cut off and shape Structural Beams

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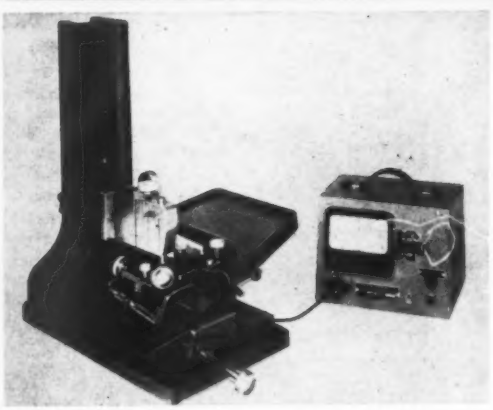
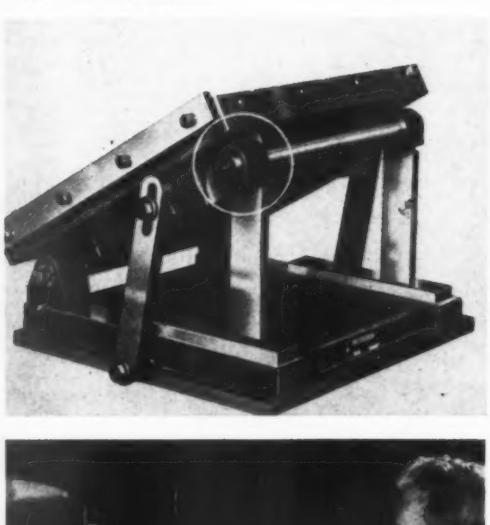


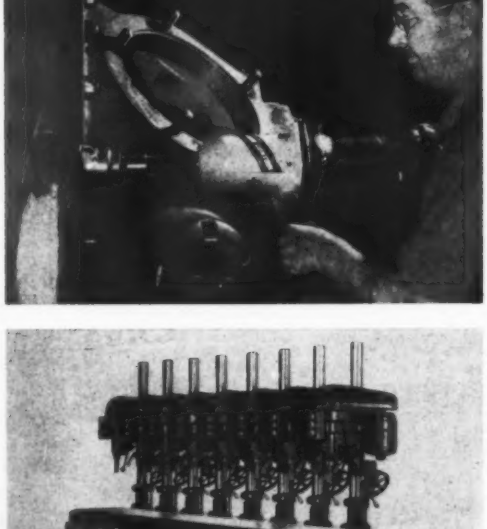
## GAGING ATTACHMENT . . .

This new attachment gages ball bearings from 1 mm up to 1½" dia to an accuracy of 0.0000005". It can also be used for random sphericity gaging. It is designed for use with standard "Micro-Ac" electronic comparators. Cleveland Instrument Co., 735 Carnegie Ave., Cleveland, or — **Inform-A-Gram No. A1.**



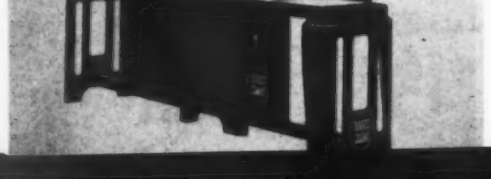
## SINE PLATE . . .

A heavy duty 12" square sine plate offers sufficient rigidity for heavy angular milling, boring, and drilling operations and the precision needed for inspection work. Any compound angle can be set up by using 2 of these plates together in any combination of right and left hand angles. Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, or **—Circle No. A2.**



## AIR TOOL . . .

The "Impactool" combines impact nutrunning with torque control. It will run a nut to any desired torque, then automatically shut itself off. It comes in 2 sizes — Size 5040T for general industry and the larger Size 5340T. Ingersoll - Rand Co., Air Tool Div'n, 11 Broadway, New York 4, or—**Circle No. A3.**



## MULTIPLE HEAD MODELS . . .

Multiple head models have been added to the Boice-Crane lines of drill presses. All multiple head models are available in either the Helmet Head ⅝" or Challenger ½" lines. They have automatic feeds, 2-speed motors, and indexing work holders. Boice-Crane Co., 963 W. Central Ave., Toledo 6, O., or—**Circle No. A4.**

## STEEL HOLE SAWS . . .

Used in portable air and electric drills, drill presses, lathe tailstocks, etc., these hole saws will cut clean, round holes in almost any machinable metal or other material. The Milford high speed steel hole saws are provided with 6 teeth/in. and

have a cutting depth of 1⅛". A complete selection of hole saw arbors, including the "follow thru" type, is also being offered. This new line of Milford hole saws is being announced by The Henry G. Thompson & Son Co., New Haven, Conn. **No. A5.**

## 1-TON AIR PRESS . . .

This press is designed for spring manufacturing including looping, bending, forming, coiling, and pressing. It can also be used in other industries for light

punching, trimming, cutting, crimping, and other secondary operations. The Carlson Co., 277 Broadway, New York 7, or — **Circle Inform-A-Gram No. A6.**

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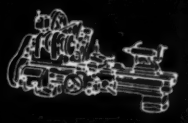

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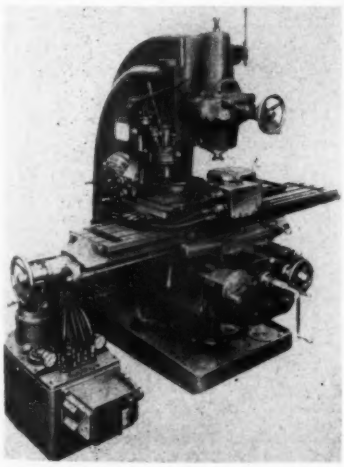
Near perfection in this chuck with true equalization is accomplished by reducing friction and simplifying the number of parts that compensate. Changing from one diameter to another can be done easily. The chuck will op-

erate equally well with the machine running or stopped, allowing automatic loading and unloading. Buck Tool Co., 2015 Schippers Lane, Kalamazoo, Mich., or —
**Circle Inform-A-Gram No. A7.**

### CAM MILLING FIXTURE . . .

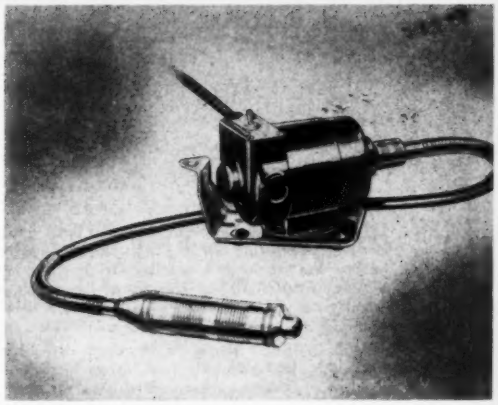
An automatic self-contained fixture for 360° copy milling of cams is the Wickman-Hayes "Cammaster". It can be used with any vertical milling machine of suitable capacity. It consists of a base on which slides



a table carrying 2 rotary tables. The tracer valve automatically controls the speed of rotation of the tables as well as the copying movement. Wickman Products Corp., 10325 Capital Ave., Oak Park, Detroit 37, or—**No. A8.**

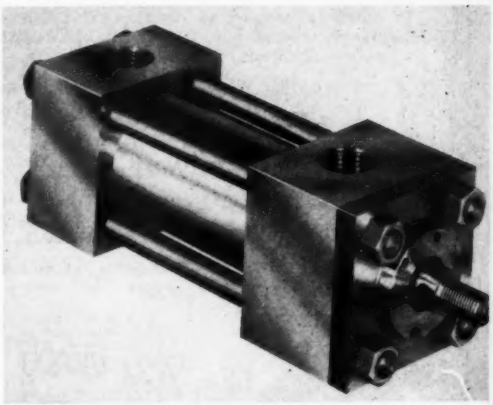
### FLEXIBLE SHAFT TOOL . . .

The high-speed "Super-Flex" tool is recommended for all types of production, bench finishing, deburring, tool and die grinding, and sharpening. The tool has the power to maintain a sustained torque under load, which is an ideal condition for carbide burr use. Dumore Co., Racine, Wis., or—**No. A9.**



### HYDRAULIC CYLINDER . . .

A heavy duty hydraulic cylinder rated at 2000 psi has been built for dependable performance under severe industrial operations. They're available in bore sizes from 1½″ to 8″ inclusive. They have multiple lip self-compensating rod gland packing contained in a removable cartridge. Ortman-Miller Machine Co., 21 - 143rd St., Hammond, Ind., or—**No. A10.**



### KNURLING TOOL . . .

Designed to save time on short production runs is the "Knurlmaster". Furnished with 3 standard hardened steel knurls, it cuts a knurl on stock as small as ⅛″ dia with no distortion and has a knurling capacity up to 1″ dia. Rockwin Mfg. Co., 45 Rose St., New York 38, or—
**Circle No. A11.**

### GRINDING MACHINES . . .

Many exclusive design features for traverse and infeed grinding of medium size parts are incorporated in the "Filmatic" 6″R, 10″L, 10″R, and 14″L plain hydraulic grinding machines. They include automatically lubricated "Filmatic" bearings and automatic grinding wheel balancing. Cincinnati Grinders Inc., Marburg Ave., Cincinnati 9, or—**No. A12.**

# Drill Hardened Steels without Annealing –

With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon–high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

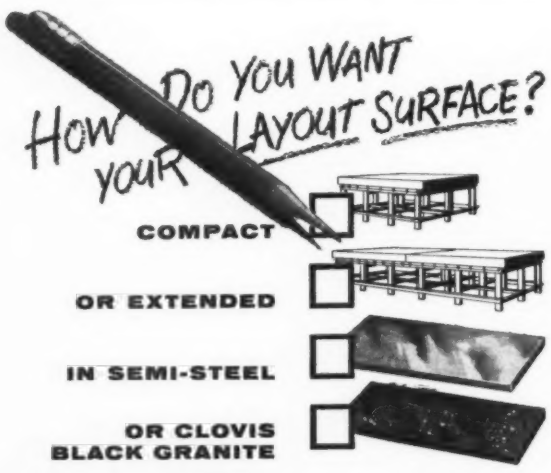
Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—With "HARDSTEEL"**

**BLACK DRILL COMPANY, INC.**
1368 East 222nd St. • Cleveland 17, Ohio

*Also makers of—* BLACK DRILLING UNITS—AUTOMATIC, SELF-CONTAINED—FOR COST-CUTTING PRODUCTION ON ALL MATERIALS
*Write for information*

CIRCLE INFORM-A-GRAM KEY NO. 1961




**CHALLENGE LAYOUT SURFACE PLATES MEET EVERY REQUIREMENT**
Available with grooving, tearing, or "T-Slots" in a complete range of standard sizes. Other sizes to order.

You name it . . . Challenge has it! A complete line of Layout Surface Plates in single plate units or multiple sections grooved and keyed into one large flat surface . . . made of special analysis semi-steel or new Clovis Black Granite. Whatever your preference, Challenge Layout Surface Plates provide the unyielding strength and accuracy you need for precision engineering.

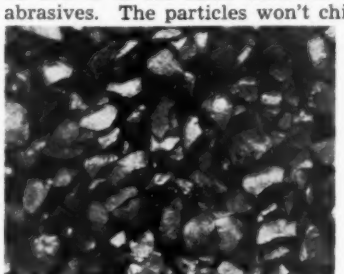
*Write for the new Challenge Catalog.*

783

Challenge THE CHALLENGE MACHINERY CO.
*Office, Factories and Show Room:* GRAND HAVEN, MICHIGAN

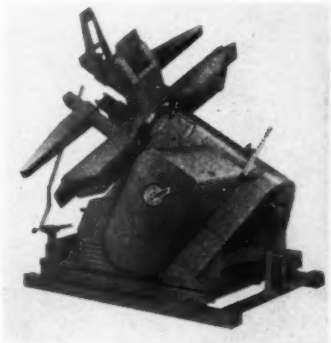
CIRCLE INFORM-A-GRAM KEY NO. 1962


**A New Steel Grit Blast Cleaning Abrasive** is used for producing etch finishes. Steeletts is specially heat treated and is in the same hardness range as chilled iron abrasives. The particles won't chip away upon impact.



The grit is adapted to etching on metallic surfaces for bonding, providing lustre on non-ferrous work, descaling alloy forgings and heat treated work, and etching steel mill rolls. Steeletts are available in 7 sizes ranging from G-16 down to G-120 from Wheelabrator Corp., 1183 S. Byrkit St., Misawaka, Ind., or—**Cirle No. A13.**

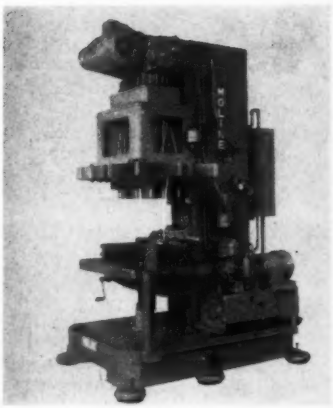
**An Angular Centering Reel** provides lateral adjustment for angular feeding of coil stock to the press. This adjustment assures perfect alignment of the coil stock with the die. The 4 expander arms will handle center I.D.'s from 15" to 28" without adapters. Sesco Inc., 8881 Central Ave., Detroit 4, or — **Circle No. A14.**



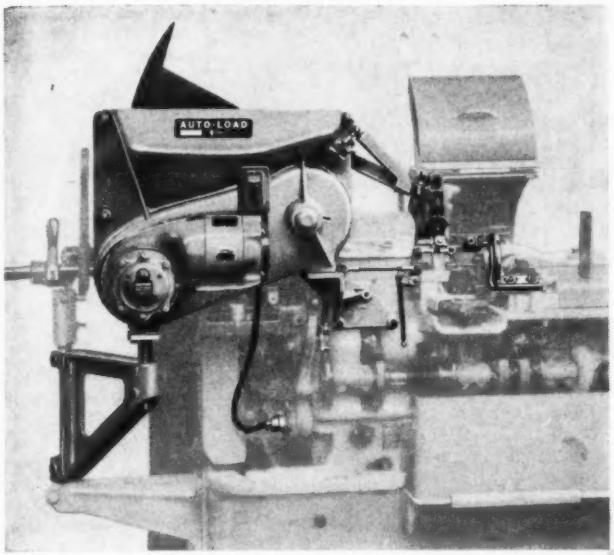
**A Fully Automatic Cut-Off Machine** with bar stock feed has been developed by Stone Machinery Co., Inc., 316 Fayette St., Manlius, N. Y. It attains speeds of up to 1600 cuts/hr and tolerances are held to less than 0.005". The work is turned out with a milled finish, eliminating need for further machining. The machine is engineered for production cutting.

**Circle No. A15**

**A Hydraulic Feed Drilling Machine** has a two-speed-and-neutral adjustment for each spindle driver. The drives are designed for easy installation or removal in that each driver assembly is made up as a unit. Model HU110 can be equipped with a maximum of 24 drivers. Moline Tool Co., Moline, Ill., or —**Circle No. A16.**



# WHY DO IT THE *EXPENSIVE* WAY?




*ONE* operator, running several Brown & Sharpe automatic screw machines equipped with AUTO-LOADS, will produce *MORE* second operation parts in *LESS* time and for *FEWER* dollars.

AUTO-LOAD automatically feeds, locates and ejects a wide variety of headed parts in the same automatic manner as bar stock parts. The AUTO-LOAD hopper is loaded without stopping the machine.

A simple change-over converts your versatile, AUTO-LOAD equipped automatic back to bar stock work.

Discover how AUTO-LOAD can reduce your direct costs. Write for our brochure.

*hi-shear* RIVET TOOL COMPANY

8924 BELLANCA AVENUE • LOS ANGELES 45 • CALIFORNIA

CIRCLE INFORM-A-GRAM KEY NO. 1971

BRAND NEW...

DE-STA-CO MIDGET-U (MODEL 215-U) TOGGLE CLAMP!

*. . . with articulated linkage and low closed-silhouette . . .*

Midget-U is an ideal tiny clamp for light-duty jobs requiring almost effortless positive clamping. . . . It has limitless applications for clamping metal, plastic and wood parts . . . Weighs only 4 oz. . . . Delivers 150 lbs. holding pressure. . . . Total length when closed—5"!

OPEN POSITION shows fine articulated linkage of components

CLOSED POSITION shows its low silhouette

*Send for Literature on this new DE-STA-CO Midget-U Toggle Clamp!*

DE-STA-CO DETROIT STAMPING COMPANY

WORLD'S FIRST LINE OF TOGGLE CLAMPS

344 Midland Avenue • Detroit 3, Michigan

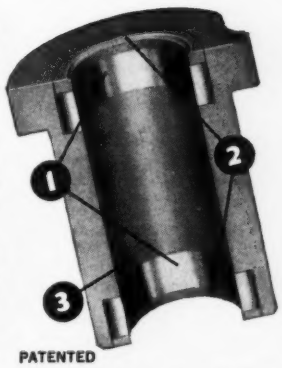
CIRCLE INFORM-A-GRAM KEY NO. 1972

MEYCO CARBIDE INSERTED DRILL JIG BUSHINGS PROVE THEMSELVES *IN Automation!*

The reason is simple: these unique bushings are ideally suited for long-running, uninterrupted operations!

MEYCO carbide inserted bushings assure long life for drills, jigs, fixtures . . . accurate work maintained, resulting in less down-time, fewer lost man-hours. Last almost as long as solid carbide bushings, cost slightly more than ordinary bushings. Get the full story:

Write for information and price list, ask for Catalog No. 41.




PATENTED

1. Tungsten carbide rings at the points of wear; 2. Steel rings protect drills and carbide; 3. Special hardened alloy steel body.

EST. 1888

W. F. MEYERS CO., INC., BEDFORD, INDIANA

CIRCLE INFORM-A-GRAM KEY NO. 1973

ALL in ONE TOOLHEAD*

BORING
FACING
TURNING
GROOVING
UNDER CUTTING

SIX SIZES AVAILABLE

ALL HAVE POWER FEED FOR FACING

Model "D"

* A BORING HEAD THAT WON'T FACE IS NOT COMPLETE

WRITE for COMPLETE DETAILS

CHANDLER TOOL CO. Muncie, Indiana

COMBINED BORING & FACING TOOL HEADS

Chandler-Duplex

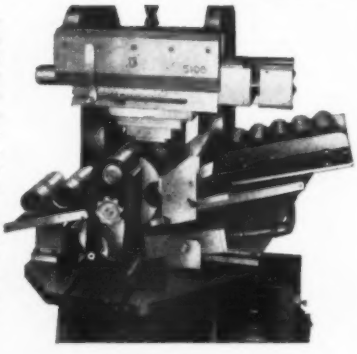
CIRCLE INFORM-A-GRAM KEY NO. 1981

Faster, Better, Less Expensive . . . with job designed MARKING GEO. T. SCHMIDT Production Marking Machines

The fully automatic, hydraulically - operated tube marker shown here was designed by GTS engineers for major automotive manufacturers.

The units roll a trademark and part number on 2500 to 3000 mild steel thin-walled tubes per hour — a speed that cuts cost per impression to the bone. Hydraulic control keeps all impressions clean, accurate, and of precisely the same depth.

Have a GTS Sales Engineer call on you, without obligation, to discuss how modern marking methods can save costs and speed production in your operation.



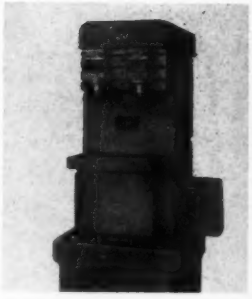
GEO. T. SCHMIDT, INC.
4112 Ravenswood Avenue
Chicago 13, Illinois

If It's Worth Making, It's Worth Marking

CIRCLE INFORM-A-GRAM KEY NO. 1982

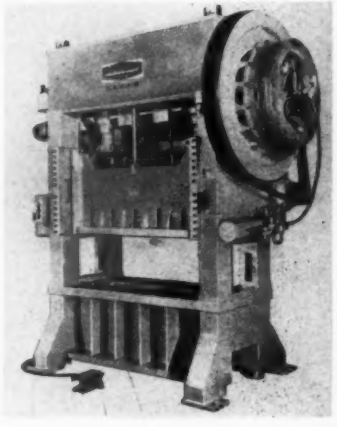
**A Knurled Head Swivel-Pad Clamp** has been designed for use where finger-tight clamping is sufficient. Except for the knurled head, this accessory is like the Vlier socket set swivel-pad clamp used for holding parts in jigs and fixtures. Vlier Engineering, Inc., 8900 Santa Monica Blvd., Los Angeles 46, or — **Circle No. A17.**

**Precision, Compactness, and Versatility** are features of an automatic vertical boring machine. It is designed for precision boring, counterboring, facing, and chamfering. It can maintain tolerances of 0.0001". Wadell Equipment Co., 119 South Ave., Garwood, N. J., or—**Circle No. A18.**



**Easier Loading** is a feature of this horizontal stock reel. By turning a handle the entire guiding mechanism swings so that the coil can be placed on the platen without disassembling the reel. The reel is more stable because of the offset leg on the base. It is available in 4 sizes, each of which will hold up to a 350-lb. coil. Durant Tool Supply Co., 136 S. Water St., Providence, R. I., or —**Circle No. A19.**

**This Double Crank Press Line** is a straight side series available in 30, 40, 60, 80 (shown), 100, and 150 ton capacities. They're high speed blanking, flywheel type presses with variable speed drives up to 300 strokes/min, or back geared presses for drawing, forming, punching, or piercing jobs. They have automatic lubrication. Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Ind., or — **Circle No. A20.**



Since 1903
**black devil**
**TWIST DRILLS — REAMERS**
Ever since 1903, when Celfor pioneered in the forging and hot-twisting of high speed drills, "Celfor" tools have been specified by the nation's leading steel fabricators for the drilling and reaming of the really rugged jobs in the toughest alloy steels.
**CELFOR TOOL COMPANY**
DIVISION OF AVILDSEN TOOLS & MACHINES, INC.
MAKERS OF "REPUBLIC," "CENTURY," "CELFOR" AND "U. S. EAGLE" BRAND TOOLS
3 PLANTS — NEW YORK — CHICAGO — LOS ANGELES

CHICAGO PLANT
322 SOUTH GREEN ST., CHICAGO 7, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 1991

**COMPLETE THE DIE-SET AT YOUR BENCH**
**Lacey Die-Set Machine**
Here's a truly "one man" press. It operates with one hand. Handy for tool and press rooms, it permits the diemaker to complete a die-set at his bench . . . saves toolroom and handling costs. Ask today for full details.
*Sole Distributors*
**MOORE SPECIAL TOOL CO., INC.**
726 Union Avenue Bridgeport 7, Conn.

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**DRILL THESE HOLES**
**BY A QUICK, EASY, INEXPENSIVE METHOD**
Your business letterhead will bring literature.
**WATTS BROS. TOOL WORKS**
Wilmerding, Penna.

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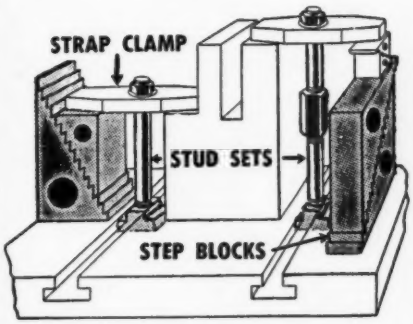

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**Clamping tools of all types.**
Write for free tracing templates
**TIETZMANN TOOL CORP.**
Box 277
North Main St., Englewood, Ohio

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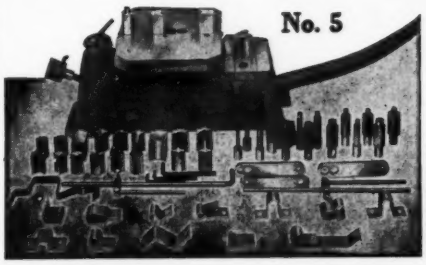
**HARDENED and GROUND HSS BLANKS**
Any decimal diameter to ⅝"—in any length.
Mirror finish surface to gage tolerance.
Many uses —
—core pins, punches, gages, ejector pins, insert pins, special tools, etc. — Quick delivery.
Write or phone Millburn 6-4222 for price list D-3
**WILLIAM T. HUTCHINSON CO.**
P.O.B. 328, UNION, N. J.
Factory: Springfield, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 1995



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**Multiform**
**BENDER-CUTTER**
**CUTS, BENDS, PUNCHES**
Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to form and cut round or flat stock up to ⅛"x1½" as illustrated. Punching and round end blanking dies available. Other models up to ¼"x6" air operated.
ALSO AIR OPERATED MODELS.
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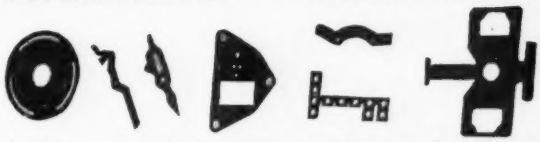
CIRCLE INFORM-A-GRAM KEY NO. 1996

**STAMPINGS - - - SHORT RUNS**

**A dependable service for small quantity requirements for new developments and production up to 50,000 pieces. QUICK DELIVERY — ACCURACY — backed by 25 years' experience.**
**SMALL LOT STAMPING CO.**
Linden 3-3700 "Dedicated to Short Runs" 1025 W. Blancke St. Linden, New Jersey

CIRCLE INFORM-A-GRAM KEY NO. 1997

Em-re
PRECISION
DIAL INDICATORS
THE MOST ACCURATE MADE

Some time ago, we recognized the need for a dial indicator with greater accuracy . . . So, using the finest tools, materials and workmanship that money could buy, we began building the "Em-re."
The result, a fully-jeweled, precision dial indicator that will consistently (after millions of checking operations) give *repeated*, accurate readings — surpassing A.G.D. tolerances. Furthermore, this is the only 100% shockproof mechanism on the market . . . Stocked in 24 models having 6 ranges from .025" to .250" with graduations in .00005", .0001", .00025", .0005" and .001".

See this new line of indicators in Booth 910 ASTE SHOW CHICAGO March 19-25

or
Send today for Bulletin 455- E.

PETZ-EMERY INC.
PLEASANT VALLEY, NEW YORK

CIRCLE INFORM-A-GRAM KEY NO. 2001

HAND KNOBS
6 SIZES
CAST IRON

Tapped, Reamed or Blank.
Hex-shaped hub for extra tightening.

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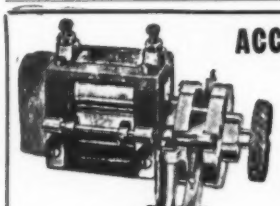
TIETZMANN TOOL CORPORATION
Dept. HK-2 • Englewood, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 2002



ACCURACY with SIMPLICITY and LOW COST with "RFC" ROLL FEEDS

Models to fit:
ANY PRESS
FOR ANY JOB
FOR STOCK UP TO 12" WIDE

Early Delivery on Standard Models

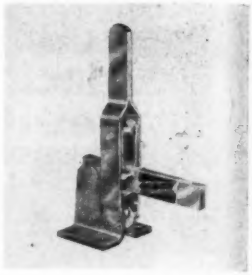
"RFC" ROLL FEEDS are quality built for long, dependable service.

*Write for descriptive literature*

ROLL-FEEDS CORPORATION
Pawtucket, Rhode Island
*An Electrix Affiliate*

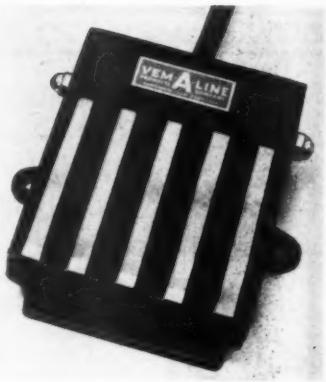
CIRCLE INFORM-A-GRAM KEY NO. 2003


**Two New Models** have been added to the line of Caddy toggle clamps produced by Erico Products, Inc., 2070 E. 61st Pl., Cleveland 3. VQ-1 Clamp is rated at 1000 lbs vertical clamping pressure and VQ-2 at 2000 lbs. They have up to 3 times more bearing surface than other clamps. **Inform-A-Gram No. A21.**

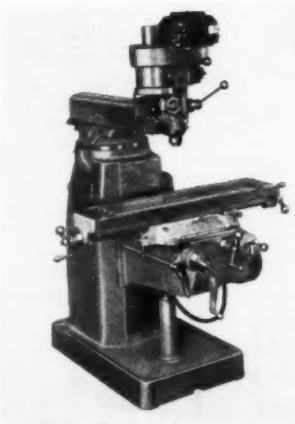


**A New Pin-Mounted Core Drill** features much deeper and more perfectly formed flutes because the cutter is positioned and driven by means of 4 pins located in the center of each flute. The 2-piece "Metcut" tool consists of a drill body and either a high-speed or carbide tipped replaceable cutter. Sizes ranging as low as ¾" can be supplied. Metal Cutting Tools, Inc., 301 S. Water St., Rockford, Ill., or—**Circle No. A22.**

**This Footswitch** is useful in the operation of industrial machines, spot welders, etc. Model FF 15AM features floor mounts so that it can be made permanent, but is also available without them. The overall size is 6" long, 4" wide, and 1¾" high. Vemaline Products Co., P.O. Box 222, Hawthorne, N. J., or—**Circle No. A23.**




**A Versatile Vertical Milling Machine** has been designed for use in tool rooms, experimental departments, and pattern shops, and for production. Model 2UVR has a universal head, variable speed spindle drive, and variable quill feed and automatic collet closer. Tree Tool and Die Works, 1600 Junction Ave., Racine, Wis., or — **Circle No. A24.**



You Can Rely on a **ROUSSELLE**

**THESE 40-TON PRESSES** take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are *very moderately priced.*

*Manufacturers of Rousselle Presses*

*Significant savings may result if you let our engineering staff assist you. There is no obligation.*

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*Rousselle Presses are sold exclusively through leading machinery dealers.*

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**Choice of 25 models in 5 to 40-ton sizes.**

**SERVICE MACHINE CO.** 2310 West 78th Street • Chicago 20, Ill.

CIRCLE INFORM-A-GRAM KEY NO. 2011

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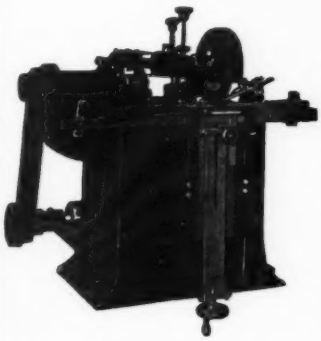
***Get Six Times More Service***
*FROM YOUR* **HACK SAW BLADES**
With a Wardwell Model EC
**COMBINATION SAW GRINDER**



The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables the operator to grind a variety of blades without dressing or changing wheels.

Saws sharpened with Model EC are better than new because they are ground **after hardening,** not before.

**Unequalled Accuracy • Simple Operation**
**Quick and Easy to Adjust Reduces Saw Purchases**

*Literature Upon Request*

**WARDWELL MANUFACTURING CO.**
3849 Ridge Road, Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

CIRCLE INFORM-A-GRAM KEY NO. 2012

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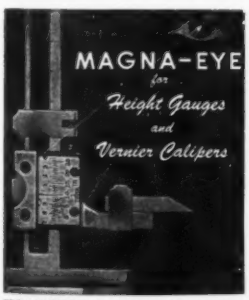


**MAGNIFIES "HARD-TO-READ" VERNIER SCALES ON HEIGHT GAGES AND CALIPERS**

**MAGNIFIES** the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. **LENS** is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work.

Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. **S No. 100** for 6" Vernier Calipers; **S No. 200** for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; **S No. 300** for most popular type 18" and 24" Height Gages and for 36"-48" 60" and 72" Calipers.

For Complete Information Write, Phone or Wire

**STEBAR COMPANY**
217 28th Ave. North Minneapolis 11, Minn.

CIRCLE INFORM-A-GRAM KEY NO. 2013

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ENCO **TINY TITAN**

**SAVE SET-UP TIME WITH**
**MODEL NO. 100 MAGNETIC BASE DIAL INDICATOR HOLDER**

- Magnetic Pull 65 lbs.
- Includes swivel adaptor permitting 360° adjustment in all directions.

See It at Booth 651 A.S.T.E. Show

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CIRCLE INFORM-A-GRAM KEY NO. 2014

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**FOR THE BUSINESS END OF THE *Automatics***
**WILLEY'S TUNGSTEN CARBIDE TOOLS**

For **PROFIT PRODUCTION** and **LONG, NON-STOP** runs... Willey's Tungsten Carbide Tools best meet the demands of Modern Automation.

**Write for catalogs:**

**Specialists in Preformed Carbide Shapes and Tools to Blueprints**

**WILLEY'S CARBIDE TOOL CO.**
1340 W. Vernor Hwy. • Detroit 1, Mich.

CIRCLE INFORM-A-GRAM KEY NO. 2015

YESTERDAY'S PIONEER . . . TODAY'S LEADER

# TAPERED END MILLS

## CONSTANT SPIRAL

**(Die Sinking Cutters)**

● The extensive line of the well known Weldon End Mills includes Tapered End Mills, Constant Spiral. Also known as Die Sinking Cutters, these end mills, filling a definite need, come in a wide range of sizes, giving a choice of many lengths and diameters. Weldon Tapered End Mills as standard stock items are all 3-flute, and offer a choice of ½°, 1°, 1½°, 2°, 3°, 5°, and 7° angles, taper on side. They represent the same high quality for which all Weldon End Mills are famous.

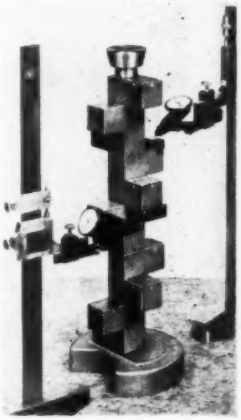
***Weldon distributors throughout U.S.A. and Canada carry complete stocks to serve you.***

**THE WELDON TOOL COMPANY**

3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

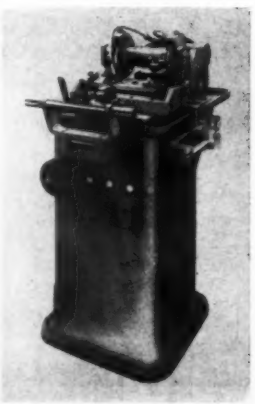
CIRCLE INFORM-A-GRAM KEY NO. 202

**Quick, Easy Gage Setups** are possible when using the "Inchmaster". It is designed to facilitate the use of precision gage blocks and to increase their versatility. Tool makers and inspectors are able to set up a number of different dimensions and check several tools, components, etc., at the same time. The "Inchmaster" features the availability of "over" and "under" measurements requiring no other attachments. Orion Tool Co., 14560 Lesure, Detroit 27, or —**Circle No. A25.**



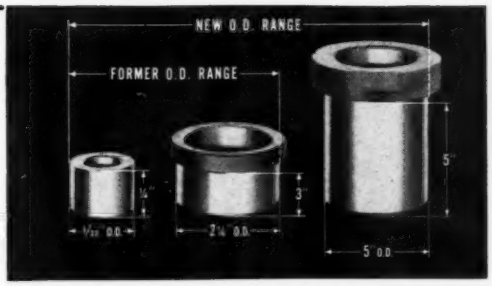
**Smooth Easy Cutting** of ferrous and non-ferrous materials with minimum burr and need for remachining is possible with the new Victor saw. The large bed and 16″ blade capacity make it versatile for various material sizes. The saw is equipped for wet cutting but can be used dry. Victor Engineering Corp., 15 Maple Ave., Paoli, Pa., or — **Circle No. A26.**

**Model BB6-A Hydraulic Bench Press** with a 6-ton normal capacity produces about 480 pcs/hr at 80% efficiency. When the die is closed, contact is made with the limit switch which holds the control levers in down position. Then an electronic timer takes over to raise the upper die after a predetermined time. Acme Press Div'n, Acme Broach Corp., Milan, Mich., or — **Inform-A-Gram No. A27.**



**The Copyrex Copy Grinding Machine** permits simultaneous grinding of 2 duplicate lathe tools, form tools, profile gages, or production parts in 1 operation. An easily made template effects the copying process through a parallelogram linkage to the twin tool holders holding the workpieces. Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N. Y., or — **Inform-A-Gram No. A28.**

## To Save You HOURS of Detailing Time...




## A New Extended Range of O. D. Symbol Listings For ECONOMY *Bushings*

ECONOMY'S new "Dimensional Data Sheet No. 7-A" includes an *extended range* of Standard Drill Jig Bushings by symbol listings up to 5" O.D. by 5" in length. This eliminates all need for detailing. You specify by symbol and hole size only.

***Ask for "Dimensional Data Sheet No. 7-A" TODAY!***

**ECONOMY TOOL & MACHINE COMPANY**
1828 South 68th Street • Milwaukee 14, Wisconsin

CIRCLE INFORM-A-GRAM KEY NO. 2031

## *precision PLUS...* ETALON No. 10

Invest in lifetime accuracy with this HARDENED STAINLESS STEEL super caliper. Wide, hand-fitted Vernier slide is smooth operating, easy to read. English or English & Metric graduations. Sizes from 7" thru 20" measuring capacity. In rich wood contour case.

*Ask your dealer, or write*

**ALINA CORPORATION • 401 Broadway, New York 13, N. Y.**

CIRCLE INFORM-A-GRAM KEY NO. 2032

## CAMS

**To Your Specifications**

• • • • •

— Except Screw Machine Cams —

• • • • •

Design Assistance Offered

**KIDDE PRECISION TOOL CORPORATION**
10 Locust Ave., Roseland, N. J.

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## HARDNESS TESTING

has been done with the SCLEROSCOPE Since 1907

•

**THE SHORE INSTRUMENT & MFG. CO., Inc.**
90-35 Van Wyck Expressway
Jamaica 35, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2034

## *New*

**13" PRECISION TURRET LATHE**

*ACCURATE*
*FAST*
*DEPENDABLE*

A new, quality-built turret lathe that can deliver high output and close tolerances on precision parts. It features exceptional ranges of facing, turning, ram and threading feeds; handling ease and rigidity. Maximum efficiency on all types of jobs.

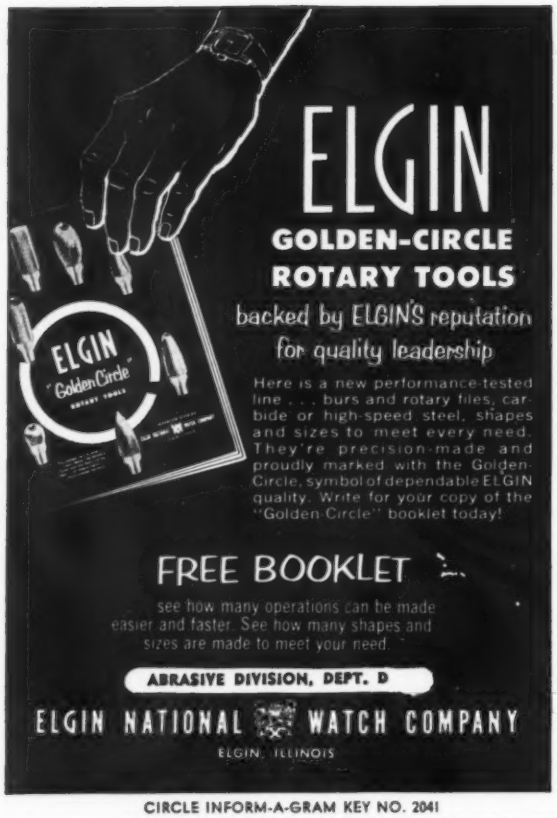
Send for complete information if you are interested in producing more precision parts at lower costs. Prices start at $2,344.

**SPECIFICATIONS:** Swing 13⅛" • Collet capacity 1" • Turret feeds 144 • Turning, Facing, Threading feeds 48 each • Spindle speeds 12.

**SOUTH BEND LATHE**
South Bend 22, Indiana
*Builders of lathes, milling machines, shapers, drill presses, grinders.*

SOUTH BEND

CIRCLE INFORM-A-GRAM KEY NO. 2035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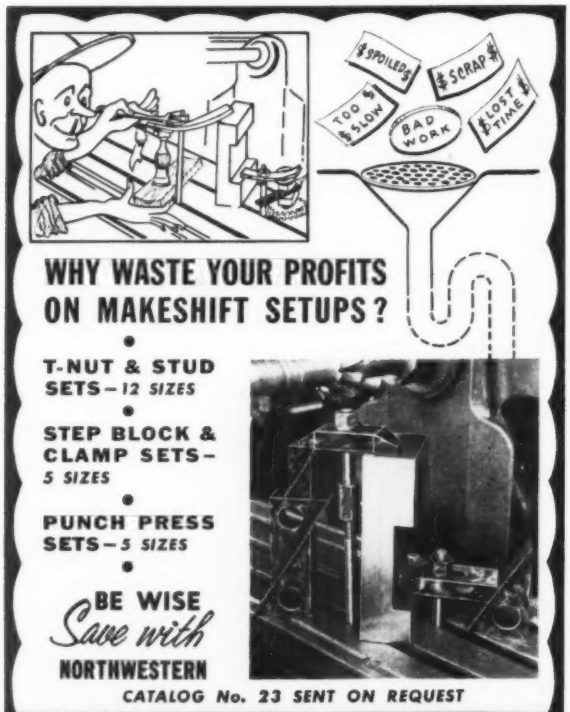
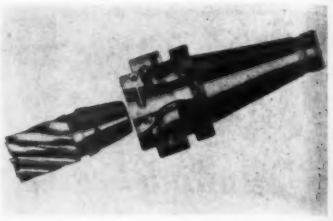
GOLDEN-CIRCLE
ROTARY TOOLS
backed by ELGIN'S reputation
for quality leadership
Here is a new performance-tested line . . . burs and rotary files, carbide or high-speed steel, shapes and sizes to meet every need. They're precision-made and proudly marked with the Golden-Circle, symbol of dependable ELGIN quality. Write for your copy of the "Golden-Circle" booklet today!
FREE BOOKLET
see how many operations can be made easier and faster. See how many shapes and sizes are made to meet your need.
ABRASIVE DIVISION, DEPT. D
ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS

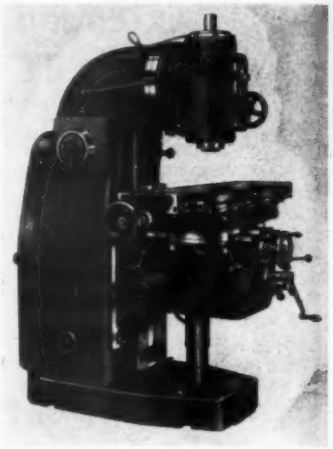
CIRCLE INFORM-A-GRAM KEY NO. 2041




CIRCLE INFORM-A-GRAM KEY NO. 2042

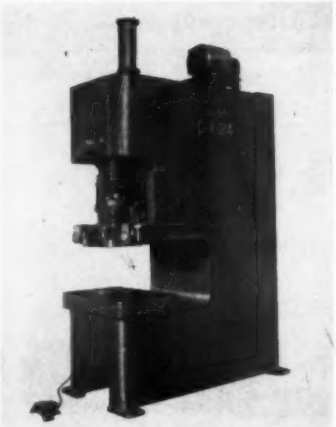



**Quick Change Tool Holders and Adapters** are used for receiving and driving standard and special, shank type tools. "Kwik-lok" holders and adapters give maximum production, rigidity, and accuracy. Falcon Tool Co., 20771 Ryan Rd., P. O. Box 4605, Detroit 34, or—**Circle Inform-A-Gram No. A29.**

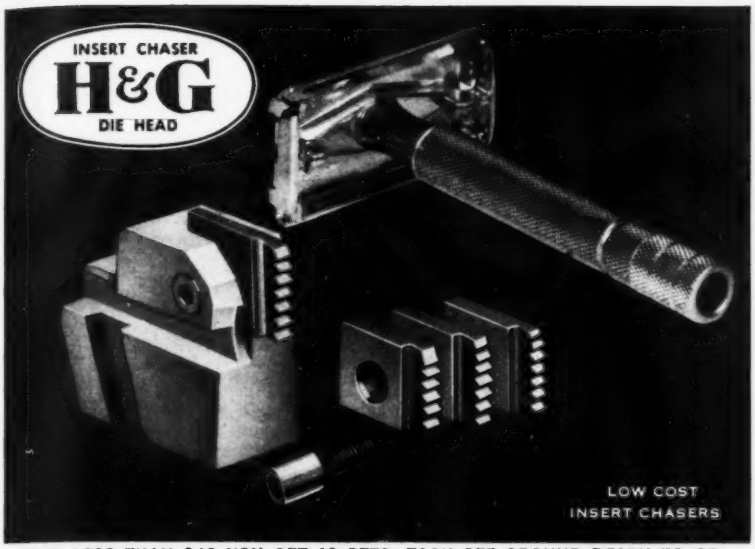


**Ease of Operation** and extreme accuracy are found in Model VF-54 =2 SAJO vertical milling machine. It is a standard duty, high speed type, having power longitudinal, transverse, and vertical feeds and power rapid traverse in all directions. Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y., or—**Circle No. A30.**

**The Metco Type CP Control Panel** makes possible a completely automatic metallizing line. All gas, oxygen, and air controls and wire feed are set at once. The operator stops and starts the spraying operations by turning the control handle. With it there are no more problems of hand adjusted and hand held operations. Metallizing Engineering Co., Inc., Westbury, N. Y., or —**Circle No. A31.**



**Front-To-Back Crankshaft Design** is a feature of Niagara deep throat presses. Styleline Series C presses are built in 8 models from 22 to 150 ton capacities. They're designed for blanking, forming, drawing, perforating, and combination die and automatic feeding operations. Details are in Bulletin 61C from Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11. **Circle No. A32.**




FOR LESS THAN $40 YOU GET 12 SETS, EACH SET GROUND READY TO GO

*Men would not accept either idea at first . . .*

**INSERT CHASERS SAVE UP TO 33%**

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ¾–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.
FREE: "UNIFIED AND AMERICAN SCREW THREAD DIGEST"

**THE EASTERN MACHINE SCREW CORPORATION 29-49 Barclay St., New Haven, Conn.**

CIRCLE INFORM-A-GRAM KEY NO. 2051

**WALLS TU-WAY BELT SANDER**

*USE IT EITHER WAY*

Full 1/3 h.p. G. E. Motor

At last, a top quality industrial sander that provides all the most wanted features — yet sells for so little.

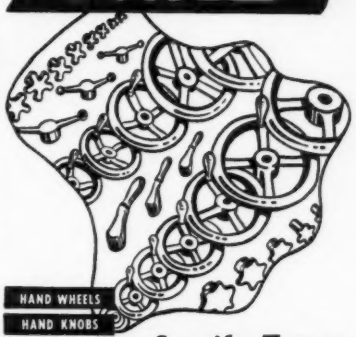
complete with cord, plug, switch ready to use **$89.95**

*Illustrated Literature on Request*
A few desirable distributor territories still available.

**WALLS SALES CORPORATION**
333 Nassau Avenue Brooklyn 22, N. Y

CIRCLE INFORM-A-GRAM KEY NO. 2052

**Tomco**




**Specify Tomco for long lasting dependability**

A complete line of high grade hand knobs, handles, and hand wheels is available from Tomco. Immediate shipments are made from stock of standard items. Specialty items are made to your specifications.

For original equipment or replacement parts look to Tomco for quality and service.

*Write for literature*

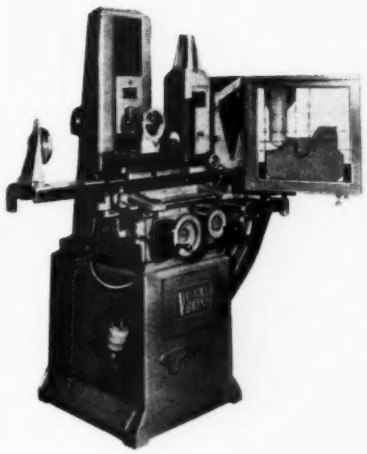
Tomco PRODUCTS CO
1623 DOUGLAS AVE.
RACINE, WISCONSIN

**Blank or Machined—from stock**

CIRCLE INFORM-A-GRAM KEY NO. 2053

**if your production calls for PRECISION**

**you need this VISUAL-GRIND**



It provides an entirely new concept accurate, surface form-grinding on tool steels or tungsten Carbide. The operator simply works to the templet • • • • on the screen which acts as a constant comparator providing continuous inspection.

*We invite your technicians to visit our plant for operational demonstrations. . . . Or write for new technical literature.*

**THE CLEVELAND GRINDING MACHINE CO.**

1643 EDDY ROAD • CLEVELAND 12, OHIO

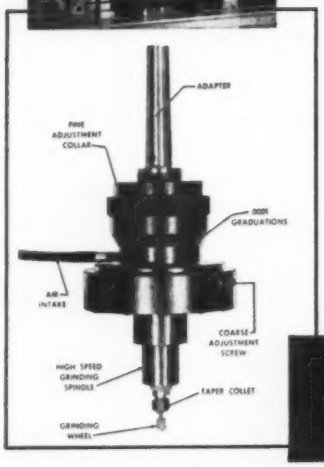
CIRCLE INFORM-A-GRAM KEY NO. 2054

## Grind Precision Holes *without* STOPPING the SPINDLE

You can save a lot of time in precision grinding with Grind-A-Matic, the new air-driven head. Unlike other comparable units, radial feed may be increased in increments of .0001" as grinding proceeds. You don't have to stop the spindle every time. Just turn the adjustment collar.

Used as a tool in any jig bore, boring mill, lathe or vertical mill, it gives you high production with the precision of a jig grinder.

Grind-A-Matic grinds holes ⅛ to 2½ inches in diameter with standard equipment. An auxiliary mounting arm increases this range to 4 inches.




*WRITE FOR DESCRIPTIVE BULLETIN*

7197

PERFEX — ACCURACY IS OUR CREED

**PERFEX**
**GAGE & TOOL CO.**
123 AVERY ST. • MT. CLEMENS, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 2061

## REID TOOL ROOM *Accessories*

**CAST IRON HAND WHEELS**

DISHED

STRAIGHT

SOLID WEB and COUNTER BALANCED

Quality at Moderate Prices!

COUNTER BALANCED

Made of fine grain cast iron. Center hole and faces of hub are true to rim. Rims and handles are ground and polished to high lustre. Top quality. Low prices. Many sizes. Immediate delivery. Alterations when required at nominal prices.

**WIDE LINE OF ACCESSORIES**

Including clamping handles, C. I. hand knobs, machine handles, compression springs, spherical washers, balanced cranks, compound rests, clamping levers and many other items at low prices.

**FREE 60 Pg. Cat.**

**REID TOOL SUPPLY CO.** Muskegon Heights, Mich.

CIRCLE INFORM-A-GRAM KEY NO. 2062

## CAMS

ALL TYPES MADE TO YOUR SPECS

Charles Eisler Jr.
President

**EISLER ENGINEERING CO., INC.**
732 SO. 13TH ST., NEWARK 3, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 2063

**SAVE MONEY - ON NEW COMPRESSORS!**

Attractive and low are the special dollar saving prices on any tank mounted unit from ½ to 5 HP. Send today for catalog and price list.

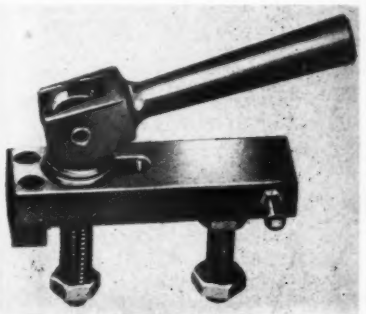
**EMGLO PRODUCTS**
80 Messenger St. Johnstown, Pa.

CIRCLE INFORM-A-GRAM KEY NO. 2064


**Eliminate Tap Breakage** through chip interference by using "Unbreaka" thread broaches (taps). They operate in a shearcutting manner to force the chip that is removed ahead of the tool and are designed to operate at 2 to 4 times normal tapping

speeds. These thread broaches don't bind or seize in the hole, have long life per grind, and can be resharpened many times. Shearcut Tool Co., 7045 Darby Ave., Reseda, Calif., or—**Circle Inform-A-Gram No. A33.**

**A New Cam Type Clamp** features greater holding pressure due to increased leverage of the fulcrum location. It uses an interchangeable soft metal pad that can be easily



shaped to fit any work surface. In addition, this single end cam clamp assembly has an end slot for lateral adjustment. Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland, or—**Circle Inform-A-Gram No. A34.**

**Quick, Accurate Setups** at any angle can be made without the use of clamps, wedges, or other methods when using the Palmgren No. 23B angle vise with swivel base. It has a 3" jaw width, 3" jaw opening, and 1¾" jaw depth. The vise can be

used with or without the 360° graduated swivel base, and can be set at any angle from 0° to 90° in a vertical plane. Chicago Tool and Engineering Co., 8383 S. Chicago Ave., Chicago 17, or—**Circle No. A35.**

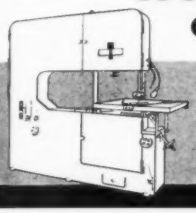
# FRICTION SAWING with Tannewitz HIGH SPEED BAND SAWS

## FASTEST, BEST MEANS OF CUTTING METALS

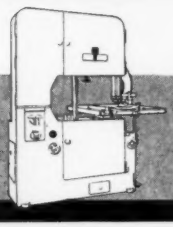
If you are not familiar with the advantages of friction sawing with these machines, by all means drop us a line asking for "Friction Sawing Data." You can save many times the cost of a Tannewitz High Speed Band Saw and greatly expedite production by using it to cut sheets of both hard and soft steel, formed or flat, trimming malleable and steel castings, cutting armor plate or many other materials. Write NOW!

THE **TANNEWITZ WORKS**

GRAND RAPIDS, MICHIGAN ☎ GL-6-1729



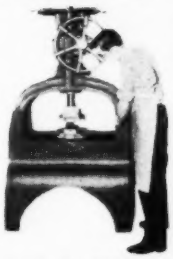
**TANNEWITZ DI-SAWS — 24", 36", 48", 60" CAPACITIES**
**for CONTOUR SAWING, FILING, POLISHING**
*The smoothest, fastest, most trouble-free Di-Saws on the market. Write for bulletin.*



CIRCLE INFORM-A-GRAM KEY NO. 2071

## MULTI-PURPOSE

PRODUCTO
No. 2 UTILITY
PRESS



You'll find continuous use for this press. Combines features of screw, ram and power presses in one powerful machine. Excellent for "shearing-in" or assembling punches and dies, separating punch and die holders . . . as a straightening press, arbor press, etc. Write for Bulletin TE4-101.

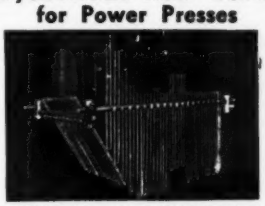
**THE PRODUCTO MACHINE CO.**
970 Housatonic Avenue
Bridgeport 1, Connecticut

CIRCLE INFORM-A-GRAM KEY NO. 2072

DYKEM STEEL BLUE
SPECIMEN
With DYKEM Steel Blue
Without DYKEM Steel Blue
DYKEM STEEL BLUE
Stops Losses
making Dies and Templates
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
THE DYKEM COMPANY
2303L North 11th St. • St. Louis 6, Mo.

CIRCLE INFORM-A-GRAM KEY NO. 2073

## ADJUSTABLE ROD GUARD
**for Power Presses**



**HUMM SAFETY EQUIPMENT CO.**
MFGR. OF COMPLETE LINE OF PRESS GUARDS
249 Sheffield Ave. • BROOKLYN 7, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2074

## JIG BORING
and
**Large Precision Machining**
Done to your specifications

We Have
14 Jig Borers

**KIDDE PRECISION TOOL CORPORATION**
10 Locust Ave., Roseland, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 2075

*You Need an Extra Hand Now to Speed Up Production!*

**HEIMANN TRANSFER SCREW SETS**

Here is the *faster*, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench —no other tools needed. Get more work now—save money too!

**HEIMANN MFG. CO. • URBANA, OHIO**

CIRCLE INFORM-A-GRAM KEY NO. 2076

If you really want to trim costs...

DON'T MISS duMONT AT THE A.S.T.E. SHOW BOOTH 1106

Minute Man
KEYWAY BROACH KITS

For cutting keyways from 1/16" to 1" in any bore from 1/4" to 3" in *one minute* for as little as *one cent.*

Minute Man
SQUARE BROACHES

For finishing cast or drilled holes in one pass. In stock for 3/16" to 3/4" squares. Hexagon broaches and Production Type Keyway Broaches also in stock.

duMONT
TOOL BITS

High Speed Ground, Square and Rectangular. Hold a keener cutting edge longer due to "balanced" toughness, red hardness and wear resistance.

Minute Man
MAGNETIC BASES

Hold dial indicator gages — save set up time. Alnico magnet has 50 lb. grip on all four sides. 360° horizontal swing, 180° vertical swing.

The duMONT CORPORATION
Greenfield, Massachusetts

Mail complete information and Price List TP

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- ☐ duMONT Super H. S. TOOL BITS
- ☐ Minute Man MAGNETIC BASES

*Name*.....

*Company*.....

*Address*.....

CIRCLE INFORM-A-GRAM KEY NO. 2081



HAND PRECISION MADE
ROTARY FILES and TOOLS

Carbide Slitting Saws
Carbide Burrs
Solid Carbide End Mills
Carbide Head-Steel Shank and Solid Carbide Reamers
Carbide Grinding Burrs
Carbide Burr Sets
Solid Carbide and Carbide Tipped Tools
High Speed Steel Rotary Files and Burrs

*All Essex Tools furnished with shanks 1/4" in diameter and 1 1/4" in length unless otherwise specified.*

In addition to the foregoing, Essex maintains a special department for the design and making of solid carbide and carbide-tipped tools, inclusive of counterbores, step-drills, twist drills, dies, grooving cutters, key cutters, T-Slot cutters, router bits, profiling cutters, etc., to sketch or blueprint.

*Complete resharpening and reconditioning service available.*

Areas available for distributors; inquiries invited.

MAKERS OF FINE TOOLS SINCE 1868

ESSEX ROTARY FILE & TOOL CORP.

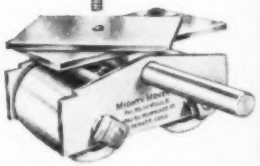
295 Madison Avenue, New York 17, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2082



LOAD GUARANTEE

100,000 LBS



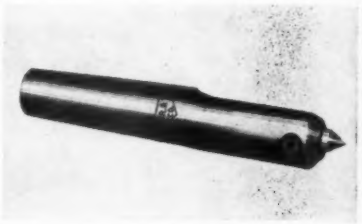
- Nothing to wear out—nothing to maintain.
- Moves heavy, bulky machines in hours instead of days.
- Cuts moving costs 80%.
- Mighty Mover heavy duty dollies have two 4-inch roller bearing cast iron wheels, tough top plate that swivels 360°.

*Write for Bulletin No. 12*

MIGHTY MOVER COMPANY
1487 S. Milwaukee St. • Denver 10, Colo.

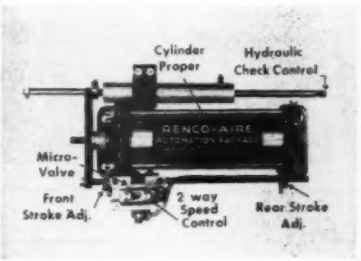
CIRCLE INFORM-A-GRAM KEY NO. 2083


**Replaceable Carbide Tips** are a feature of "Grip-Tip" centers. Solid carbide tips are available in 1/4" and 1/2" dia and are accurate to 0.0003". They lower costs and increase machine production time since the tips

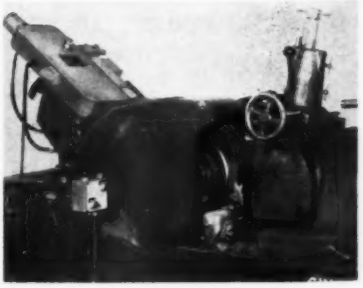


can be reground at a central location rather than at the machine. Detroit Reamer & Tool Co., 780 W. Maple Rd., P.O. Box 174, Birmingham, Mich., or—**Inform-A-Gram No. A36.**

**A Micro-Action Directional Valve** is incorporated in an air cylinder. It is air operated, so no electrical installation is needed. In addition, the Renco-Aire cylinder has an adjustable 2-way speed control and hydraulic check. Available in any stroke, the cylinder converts such tools as hand mills, grinders, etc. for automatic table operation. Renco-Toledo, Inc., Dept. TP-1, 819 Reynolds Rd., Toledo 7, O., or—**No. A37.**




**An Automatic Contour Wheel Dresser** has been developed for centerless grinders. Model 83 contour wheel dresser can dress any profile on the grinding wheel into which the diamond can enter. The dressing speed of the diamond is controlled so that it will travel at a constant peripheral speed. The dresser can be used for contours where an accuracy of 0.0002" or better is required. Hoglund Engineering and Mfg. Co., Inc., 343-5 Snyder Ave., Berkeley Hgts., N. J., or — **Circle Inform-A-Gram No. A38.**

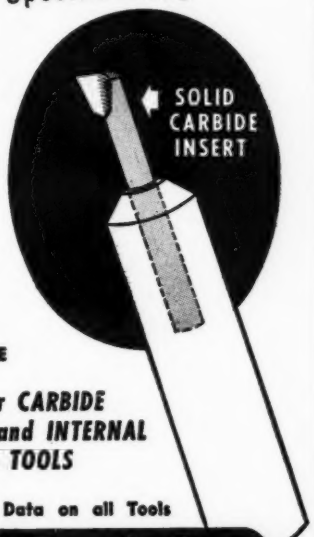


COMET® offers SOLID CARBIDE INSERT BORING TOOLS

Made to Your Specifications

FOR UTMOST PRECISION AND RIGIDITY, USE COMET® BORING TOOLS WITH SOLID CARBIDE INSERTS SET INTO STEEL SHANKS

SIZES FOR HOLES FROM 1/16" UPWARD




ALSO AVAILABLE

HIGH SPEED or CARBIDE BORING, FACING and INTERNAL THREADING TOOLS

Write for Complete Data on all Tools

COMET® Tool Co.

738-T BROADWAY • NEW YORK 3, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2091

*You can easily remove broken pipes, studs and screws that defy movement . . .*

WITH REPS PIPE & STUD EXTRACTORS

MAKES STRONG FOUR POINT GRIP WITHOUT HAMMERING

In sizes for every pipe 1/8" to 2", every stud and screw 3/16" to 3½".

A *Specialized Tool* that makes a strong bite, pulling rather than reaming. Hardened steel—will remove any material. Simple, immediate, positive.

Send for descriptive bulletin No. 38 listing these and other Walton Specialized Tools: Tap Extractors, Tap Extensions and "Walton-American" Tool Holders. All tools offered for a 30 day FREE TRIAL.

The WALTON Company

HARTFORD 10, CONN.

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IF

You Must Cut Production Costs

THEN

ELIMINATE MACHINING!

in the following operations:

Accurate location and securing drill jig bushings,

Anchor bearings and parts in machinery,

Anchor bushings in abrasive wheels,

Center and secure shafts in Alnico rotors.

Write for Bulletin A1 today—it tells how. Better still — come see our demonstration at Booth No. 773, A.S.T.E. Exposition — Chicago, March 19-23. See above and many other applications.

CERRO DE PASCO CORPORATION

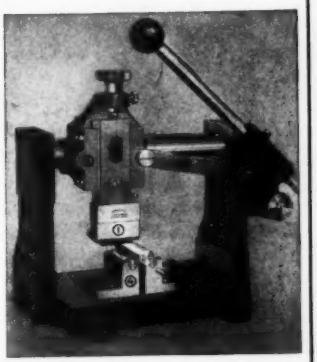
316 Park Avenue, New York 22, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2092

MODEL 301 NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

Bench Marking Machine



Here is an inexpensive machine, designed by Numberall for marking all kinds of cylindrical parts. It rolls on the characters accurately and with even depth.

Its operation is simple and requires no special skill. A hand lever draws the carriage, containing a numbering machine, or typeholder or special die, along the round sliding bar. Depth of impression is easily adjusted and maintained simply by turning the knob on top of the sliding head.

Model 301 can also be used to mark flat parts with a roller die.

Write for bulletin TP-301.

NUMBERALL STAMP & TOOL CO.

HUGUENOT PARK STATEN ISLAND 12, N. Y.

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**INDUSTRIAL MAGNIFIERS**

**--precision tools for shop seeing**

**JUST A FEW OF MANY**

**Why so many kinds?** Because magnifiers are tools, each one for a specific kind of work. The illustration above shows a variety of stand-mounted magnifiers, loupes, pocket magnifiers. Each is for given conditions of magnification, working distance, field of view, depth of field.

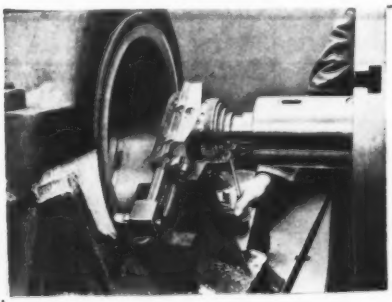
**How to pick the one you want?** Send for our 24-page booklet, "Industrial Magnifiers." It tells you what to look for in selecting a magnifier, why a good lens is important, includes catalog descriptions and prices.

*Ask for Bulletin I-67, "Industrial Magnifiers"*

**BAUSCH & LOMB OPTICAL CO.**

50403 BAUSCH STREET • ROCHESTER 2, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2101



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**Nine Models for Smallest to Largest Work Ranges**

**Face - Bore - Turn - Recess - Undercut, etc. All Automatically up to 36 1/4" on one machine.** For Precision Work and Most Economical and Automatic Operation.

- Twelve Automatic Slide Feeds
- Automatic End Release
- Sturdy, Compact Construction
- Increase Production; Make Better Finished Work

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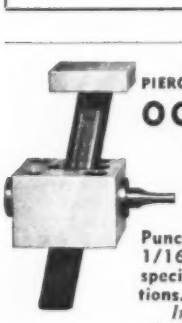
**Karl A. Neise** 404 Fourth Ave. N. Y. 16, N. Y., Dept. TP.

CIRCLE INFORM-A-GRAM KEY NO. 2102



**FOR SIDE HOLE PIERCING OR FORMING USE**

**OCTOCAMS**

(pat. pend.)

**OCTOCAM pays for itself through savings in toolmaking time.**

**Punches available from 1/16" to 1/2". We build specials to your specifications.**

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RATES—$2.00 SERVICE CHARGE PLUS 20c PER WORD, PAYABLE IN ADVANCE

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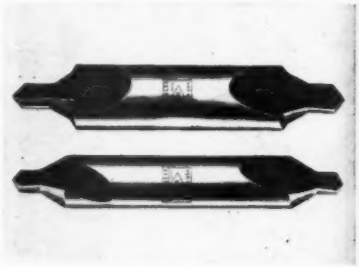
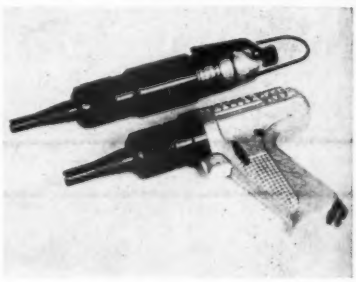
Machinists tool manufacturer plans change in sales set-up. Desires manufacturers representatives to handle complete line exclusively in various sections of the United States and Canada. Will consider men of high calibre with good following. Send complete resume of territory and lines now handling to Box TP-356.

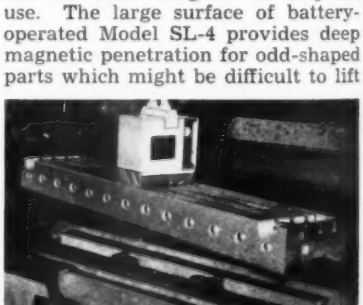

**A Combined Drill and Countersink** features spiral flute construction. This new tool is designed to provide smoother, more accurate holes. It will increase production by providing freer cutting chip formation and more efficient chip removal. The tool is available in the Plain Type, sizes 1 to 8, in high speed or carbon steel; and the Bell Type, sizes 11 to 18, in high speed steel. Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich., or — **No. A39.**



**A "Wire-Wrap" Tool** makes solderless wrapped electrical connections with 14 and 16-gauge wire in less than 1 sec. Any solid 14 or 16-gauge wire can be used. Either square or rectangular terminals can be made from commonly used metals. The maximum terminal dimensions are 0.132" x 0.132", with a minimum 0.375" spacing between terminals. Keller Tool Div'n, Gardner-Denver Co., Grand Haven, Mich., or — **Circle No. A40.**



**A 4000-Lb Capacity Lifting Magnet** has been designed for in-plant use. The large surface of battery-operated Model SL-4 provides deep magnetic penetration for odd-shaped parts which might be difficult to lift with sling, hook, or grapple. Its length of haul is not restricted by electrical wires. The Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Hgts., Cleveland, or — **No. A41.**



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WORLD'S HARDEST METAL
• New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G. METAL CARBIDES CORP., Youngstown 12, Ohio.
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How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!
Patents Pending
One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.
The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.
SLEEVES MADE IN FOLLOWING SIZES:
3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 1"
STURDY BROACHING SERVICE, INC.
23516 TELEGRAPH RD., DETROIT 19, MICH.
Write for Literature

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Faster production and improved quality in the automatic arc welding of trailer frame seams will be achieved by this new fixture at PAMCO COMPANY, Frazer, Michigan, through the use of Lapeer Air Clamps.

Pictured above is the Pamco holding fixture which features a battery of 10 Lapeer AO-1200 Air Clamps in place of the time-consuming C-Clamps formerly used.

This is another example of Lapeer's know-how—its ability to help industry cut time and slash costs. If you have a work holding problem, Lapeer-designed clamps can help you do a better job—at lower cost. Write today for complete information.

See all of these at our BOOTH #553, A.S.T.E. SHOW at Chicago in March.

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Manufacturers of a complete line of Stationary and Portable Clamps and Pliers

KNU-VISE PRODUCTS LAPEER MANUFACTURING CO.

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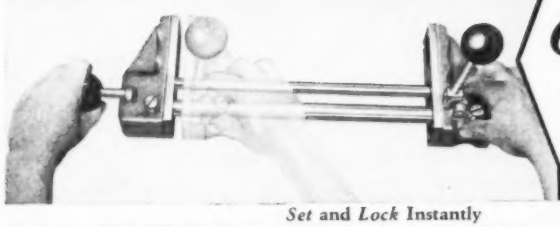
WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

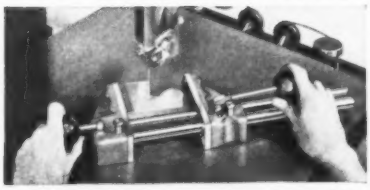
CIRCLE INFORM-A-GRAM KEY NO. 2114

NEW HEINRICH WORK HOLDERS

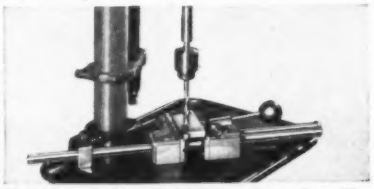
Set ...IN A FLASH!



*Set* and *Lock* Instantly



Heinrich Band Saw Vise. Capacity, 12½". Hands are clear for *safe* operation.



Heinrich Safety Drill Vise. Capacity, 6". Fits any style drill press.

New HEINRICH Grip-Master Work Holders set and lock instantly. Band Saw Vise has removable shoulder screws for automatic chain feed operation. Safety Drill Vise with table mounting attachment leaves operator's hands free . . . safely secures vise . . . eliminates danger of unit spinning or breaking loose.

*Write for FREE Catalog*

"Circle-Grip" locking mechanism used in Grip-Master Vises is also used in HEINRICH Work Holders.

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**HEINRICH TOOLS, Inc.,** Dept. 136-C Racine, Wisconsin

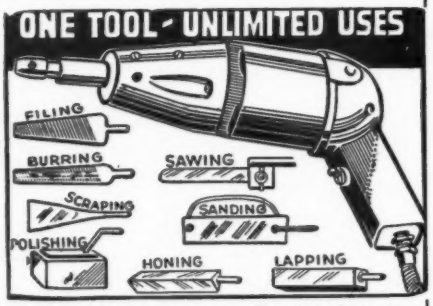
CIRCLE INFORM-A-GRAM KEY NO. 2121

EXPEDITE FINISHING OPERATIONS

with

RECIPROCATING ACTION TOOLS

***Portable — Light in Weight Easy to Use — A Real Time Saver in Any Shop.***




Many hand finishing operations can now be done quicker, easier and more accurately with these electric tools. Deliver 1000 PUSH-PULL strokes per minute. Fixed strokes are either ⅛" or ⅜" long. Operate on 110 Volts AC or DC.

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CHASO TOOL COMPANY offers a complete line of threading tools, including self opening dieheads, solid adjustable taps and chaser sharpening fixtures.

CHASO manufactures all type chasers, including tangent, circular, and radial chasers in both cut thread and ground thread, for most makes of dieheads.

*When you think of chasers think of CHASO*

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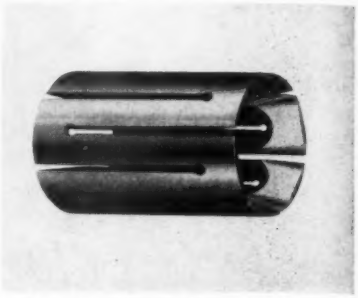
**A "Tork-Lok" Collet Arbor** uses inclined flats in both collet sleeve and arbor shaft eliminating the inherent clearances of the cone design. Positive drive is guaranteed through these mated flats. Built-in safety stops control both expansion



and contraction. The arbor is available in 3 styles — between centers, flange mounted draw-bar, and air operated draw bar. N. A. Woodworth Co., 1300 E. Nine Mile Rd., Ferndale 20, Mich., or — **No. A42.**

**Carbide Tool Inserts** and "throwaways" are completely ground by a self-contained, semi-automatic lapping machine. The Empire multiple tool lapper provides controlled micro-finish even on hardest grades of carbide. Tool holders are available to accommodate all standard triangular, round, and square inserts or "throwaways". Once loaded, the machine requires no further attention until the grinding operation is completed. Empire Corp., 1566 S. 83rd St., Milwaukee 14, or — **Circle Inform-A-Gram No. A43.**

**Unipunch Series B Perforating Units** are used for straightline, staggered, and overall gang-punching setups on templates, T-slotted plates, and rails in presses and press brakes. They're equipped with 2-piece punches. Snap-on strippers eliminate expensive individual stripping

guide buttons for each size punch tip. They're designed with a 5½" shut height and 2-19/32" die height for punching round, shaped, and clustered holes up to 3½" dia in material up to ⅛" thick. Punch Products Corp., 3800 Highland Ave., Niagara Falls, or — **Circle Inform-A-Gram No. A44.**

SPEED UP PRODUCTION

with these PALMGREN

ANGLE VISES · MACHINE VISES

ROTARY TABLES

See how Palmgren vises, rotary tables, milling attachments and other machine tool accessories can speed up YOUR production and save time and money, too. Used in all industries, EVERYWHERE. 64 different models and types. Send for new catalog No. 203.

$39.95

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4" jaw

Solve difficult Angle jobs on the production line—quick, accurate setups at any angle in such operations as drilling, milling, grinding. Also other jaw sizes: 1½", 2½", 3", 4", 6" and 8".

No. 60B MACHINE VISE $89.95

6" jaw

A precision vise, with or without swivel base, constructed for heavy-duty service in such jobs as milling, drilling, grinding, shaping and other operations requiring a rugged holding device. Also 40B—4" jaw.

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No. 83 ROTARY TABLE

Two cross feed slides and Rotary Feed converts your drill press for vertical milling. The No. 83 has an 8" diameter top with T slots ⅝" x 1" x 5/16" for keys or T bolts. Rotary dial is graduated in 3 minute intervals.

CHICAGO TOOL AND ENGINEERING CO.

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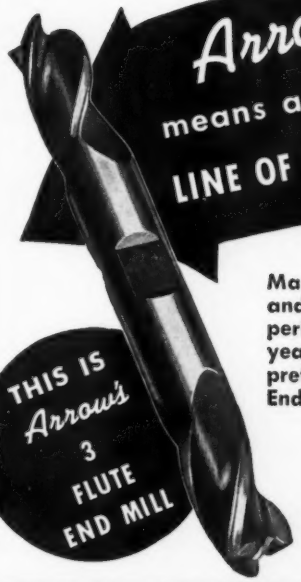
ARROW TOOL & REAMER CO. • Established 1916



Arrow means a complete LINE OF END MILLS

THIS IS Arrow's 3 FLUTE END MILL

Manufacturing skill and tool making experience for over 37 years — adds up to preference for Arrow End Mills.

Drop In

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FREE... 64 PAGE CATALOG

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COMPLETE DETAILED SPECIFICATIONS

ENGINEERING DRAWINGS • COST SAVING DATA

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JERGENS TOOL SPECIALTY CO.

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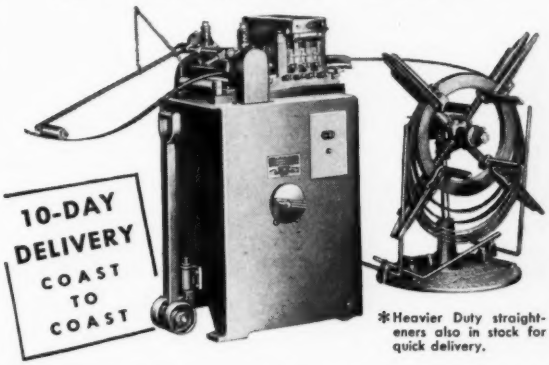
STRAIGHTEN COIL STOCK

from ½" to 8" wide...

from .018" to .065" thick...

on a LITTELL "308"*



10-DAY DELIVERY COAST TO COAST

*Heavier Duty straighteners also in stock for quick delivery.

Littell "308" Variable Speed Straighteners flatten coil stock...synchronize feeding of stock with speeds of automatic presses . . . simplify hand feeding. The "308" has brought new speed, efficiency and economy into stamping, blanking and shearing operations from coast to coast. Get full details on these portable straighteners.

*Write for Catalog Section 3H*

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Speed with Safety

ROLL FEEDS • COIL CRADLES

STRAIGHTENING MACHINES

REELS • AIR BLAST VALVES

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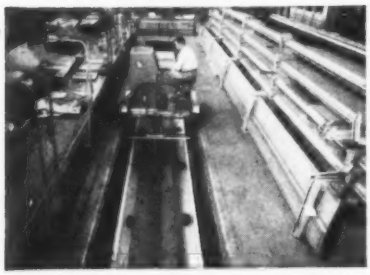
CIRCLE INFORM-A-GRAM KEY NO. 2134

Sperry
ultrasonic inspection news

## 40-Foot Aluminum Extrusions Inspected Under Water



**How to inspect** 40-foot, 1850-lb. aluminum extrusions for internal defects prior to machining into helicopter blades?—Piasecki Helicopter Corp., Morton, Pa., required an immediate answer to this problem.

**The solution** was provided by Sperry Products' Commercial Testing Service. At Sperry's Danbury laboratory personnel and equipment were available, including a 100-foot tank which would permit ultrasonic immersion inspection of the huge extrusions.

**Actual inspection** was done with a Sperry UW Reflectoscope and a PH Positioner. Mounted on an electric car which also carried the operator, this unit was capable of testing at speeds ranging from 2 feet to 32 feet per minute.

To best meet your individual inspection requirements, consult Sperry Products Commercial Testing Service. Return coupon for full information.

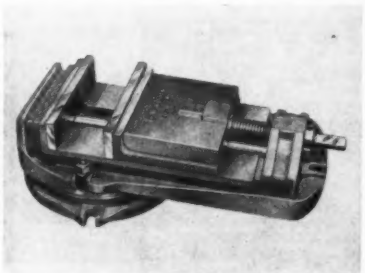
sperry products INC.
Danbury, Connecticut

☐ Send me Commercial Testing Service information.
☐ Send me the Ultrasonic News Letter.
☐ Send me Reflectoscope information.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

CIRCLE INFORM-A-GRAM KEY NO. 2141

**A Flange Construction Milling Machine Vise** has been introduced by L-W Chuck Co., 72 S. St. Clair St., Toledo 4, O. The jaws of the "Mogul" vise measure 8⅝" wide and



2-3/16" deep, and open 6" when in place. All surfaces are ground for extreme accuracy and the work holding surfaces are held at true right angles or parallel to the table. **Circle Inform-A-Gram No. A45.**

**With "No-Ding" Production Rolls,** the rubber tire can be replaced without removing the wheel from the conveyor. The oil resistant Neoprene rubber tire slips on and off by applying pressure on the metal hub, eliminating 80% of maintenance costs on roll replacement. It is designed to handle large capacity production runs. Thirty-two fins have been placed across the 1¾" x 4" roll, permitting individual fins to give without being cut or torn by the moving load. Cougar Engineering Co., 12017 Woodbine, Detroit 28, or— **Circle Inform-A-Gram No. A46.**

**Control Mechanical Forces** at various load points with the new multi-switch force gage. Available in 11 different capacities, the device can be ordered with only 1 control

switch or as many as 4. It can be clamped to working surfaces or bolted in place. W. C. Dillon & Co., Inc., P.O. Box 3008, 14620 Keswick St., Van Nuys Calif., or — **No. A47.**

**Sets of Boremaster Plain Rings** for setting dial bore gages, I.D. micrometers, etc. are now available. The rings are accurate to 0.0001" or less for roundness, straightness, and taper with a tolerance of ±0.0002" from basic size. Size Control Co., 2500 W. Washington Blvd., Chicago 12 or — **Inform-A-Gram No. A48.**

MAXWELL
Automatic RECESSING TOOLS
REDUCE INTERNAL FORMING COSTS

These fully automatic quickly adjustable tools save time, and cut costs on precision grooving, undercutting, inaccessible spot facing, chamfering, back facing and necking.

Maxwell Type JF Automatic Recessing Tools operate on the principle of an eccentric cutter holder actuated on its own axis. This is accomplished by the unique Maxwell Helical Gear and Diagonal Toothed Rack Mechanism.

They are used with jig or fixture on automatic or manual feed machines. Long-life circular form cutters, or tool bit holders with tool bits may be used. Location and diameter of recess are individually controlled by stop collars, adjustable to within ± 0.001-inch. Five sizes available to pilot into 1" to 2¼" bushings. Furnished with standard, adjustable adapter, quick change, straight or special shanks.

WRITE TODAY FOR BULLETIN NO. J-F

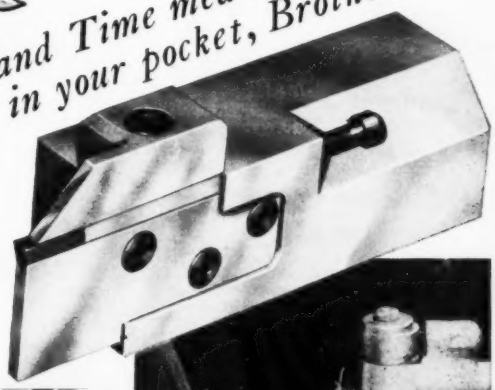
388R-MC

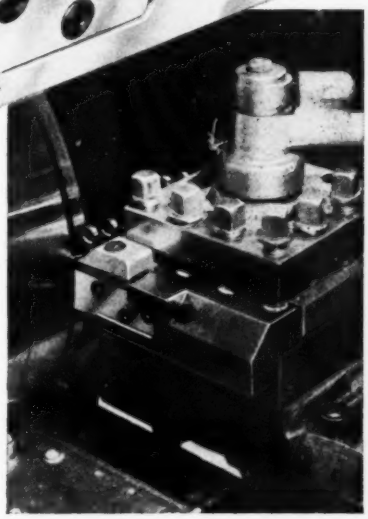
THE MAXWELL COMPANY
MACEDONIA, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 2142

# HERE'S ANOTHER PDQ QUICK CHANGE TOOL THAT SAVES YOU TIME*

*and Time means Money in your pocket, Brother!





## MANCHESTER
### Cut-Off Tool

Cut out machine down-time! Change carbide insert in the Manchester PDQ Cut-Off Tool in just 15 seconds . . . and have it back on the job accurately self-centered, without costly adjustment. Positive insert backing provided by adjustable rear stop. For turret lathes, engine lathes, cut-off machines and automatics. Write today for complete information.

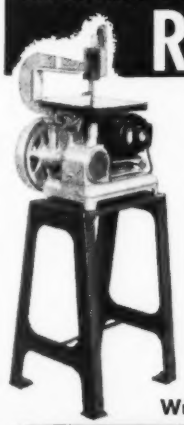
**PORTAGE DOUBLE-QUICK TOOL CO.**
1046 Sweitzer Avenue Akron 11, Ohio

See the Manchester Cut-Off Tool at Booth No. 669 at the ASTE Exposition, March 19-23, Chicago International Amphitheatre.

CIRCLE INFORM-A-GRAM KEY NO. 2151

Smoother Production! Higher Output! Lower Costs!

# RICE-MILWAUKEE



**DIE FILERS** . . . for straight-line sharp corner filing, sawing and lapping.

This low cost precision-built unit performs all die making operations at savings up to 40%. Furnished complete with motor and two overarms. No extras to buy.

**PROFILE GRINDERS**

. . . for high speed Precision Grinding of Curved and Irregular Contours.

Standard features include 20,000 or 30,000 R.P.M., or a combination of these spindle speeds, ½ H.P. motor, Collet Chuck, Compound tilting table, built-in wheel dresser.

Write for Illustrated Bulletins and Prices

**RICE PUMP & MACHINE COMPANY**
228 PARK AVENUE BELGIUM, WISCONSIN

CIRCLE INFORM-A-GRAM KEY NO. 2152

Specify

IDEAL

LIVE CENTERS

*Guaranteed to match the accuracy and capacity of your lathe*

Widest range of models, load capacities and tapers for every job!

ORDER FROM YOUR IDEAL DISTRIBUTOR OR MAIL COUPON

IDEAL

**IDEAL INDUSTRIES, Inc.**
1334 Park Ave., Sycamore, Illinois

Kindly send us data on Ideal's complete line of LIVE CENTERS.

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COMPANY_____

ADDRESS_____

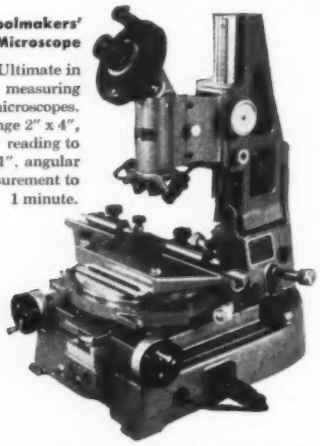
CITY_____ ZONE____ STATE_____

CIRCLE INFORM-A-GRAM KEY NO. 2153

Visit our booth, No. 1126, ASTE Industrial Exposition, Chicago

**Toolmakers' Microscope**

Ultimate in measuring microscopes. Range 2" x 4", reading to 0.0001", angular measurement to 1 minute.



***Precise measurement to 0.0001"***

## Slash rejects, save money with Gaertner measuring microscopes

Precise, versatile, easy-to-use Gaertner measuring microscopes assure positive, direct measurement of precision parts. You see clear, sharply-defined images. No physical contact to distort or injure object being measured. Enjoy new production savings with Gaertner optical instrumentation. Write for complete data on the Gaertner line of industrial microscopes.

**Coordinate Measuring Microscope**

High precision, low cost instrument for 2-dimensional linear measurement. Range 2" x 2", reading to 0.0001".

**Micrometer Slide Comparator**

Reliable, low cost instrument for linear measurement. Ranges up to 4", reading to 0.0001" or 0.00005".

**Scale Micrometer or Shop Microscope**

High quality, low cost instrument with range up to 0.100". Reading to 0.001", easy interpolation to 0.0002".

**Write for Bulletin 161-54 showing applications, models, specifications.**

**The Gaertner Scientific Corporation**

1242 Wrightwood Ave., Chicago 14, Ill.
Telephone: BUckingham 1-5335

CIRCLE INFORM-A-GRAM KEY NO. 2161

**.0005 HOLE LOCATION IN 3 MINUTES**

**$10.00** With Case

**YOU NEED THIS TOOL EVERY TIME YOU USE A DRILL CHUCK or BORING HEAD in a VERTICAL MILL, HORIZONTAL MILL or JIG BORER, if the hole is located from a surface that has been machined.**

This toolmaker's wiggler rotates in the machine spindle from 300 to 1200 R.P.M. and is held in a 3/8" collet.

- NO GUESSWORK OR EYE-STRAIN.
- LOCATES FROM FLAT OR ROUND SURFACE.
- LOCATES FROM STEP ONLY .010" HIGH.
- IDEAL TOOL for LOCATING HOLES IN DRILL JIGS, DIES, TOOLS and MACHINE PARTS.
- MADE FROM HARDENED TOOL STEEL WITH ALL SURFACES GROUND.

Stocked by dealers in most principal cities.

**GLOVER MFG. CO.**

511 Terrace St. Meadville, Penna.

CIRCLE INFORM-A-GRAM KEY NO. 2162

**COOPER WEYMOUTH**

**VARIABLE SPEED**

**STOCK STRAIGHTENERS**

Portable cabinet units in sizes 6" up to 24". Constant or variable speed drives with forward, reverse and cut-out switch. Five, seven or nine straightening rolls. Pinch rolls and all bottom straightening rolls power driven.

See Booth 208 A.S.T.E. SHOW

**COOPER WEYMOUTH INC.**

277 NOBLE AVE., BRIDGEPORT 8, CONN.

CIRCLE INFORM-A-GRAM KEY NO. 2163

**SLASH TOOLING COST, TIME FOR ANY MACHINING JOB**

**WE'LL PROVE IT WITH A FREE DEMONSTRATION!**

Now . . . a low-cost universal work holding fixture for use on lathes and most other machine tools! Attachments shown below hold any round or irregularly shaped part, position it fast and accurately for any operation. Users report big savings! Accurate to .001".

Write for free demonstration or Bulletin No. 113

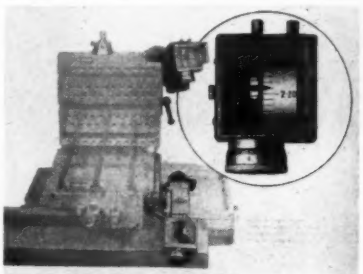
**MICRO-CHUCK**

Division, SCOTT-BROWNE CORP.
Batavia Pike • Newtown, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 2164

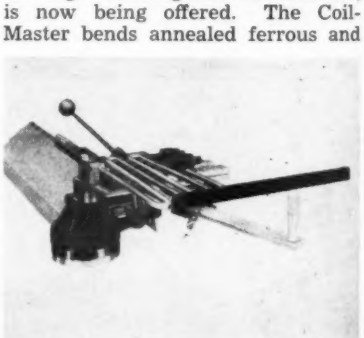
**A Controlled Centering Pressure Chuck** can center at a pre-set centering pressure thin-walled rings and parts without distorting them during the centering process. It has accurate repetitive centering to 0.0005 T.I.R. There is complete and automatic sealing of all jaw ways from chips regardless of jaw position. Horton Chuck Div'n, The E. Horton & Son Co., Windsor Locks, Conn., or — **Circle No. A49.**

**Accurate Manual Work Positioning** for multiple precision boring operations is possible when using Hilger & Watts machine tool scales and projectors. The scales are in solid mounts, fully enclosed, and the projection screens are out of the way of the workpiece so that both are protected. They're shown on an Ex-Cell-O boring machine. Engis Equipment Co., 431 S. Dearborn St., Chicago 5, or — **Circle No. A50.**



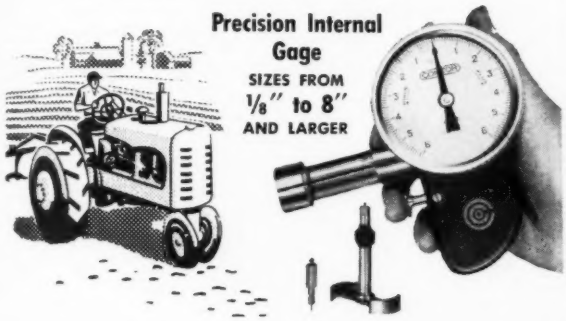
**The Micrometer Set Master** has been developed to assist the shop man and the inspector in checking micrometers. This unit consists of 6 individual cylinders bolted together for convenience, in sizes from 1" thru 6" in steps of 1". Each master is calibrated and the size marked on each section to 4 decimal places. Size Control Co., 2500 W. Washington Blvd., Chicago 12, or — **No. A51.**

**A New Coil Bender** that produces continuous serpentine coils from a single length of tubing without removing the tubing from the machine, is now being offered. The Coil-Master bends annealed ferrous and non-ferrous tubing from ¼" to 1" O.D. It can also be adapted to standard bending. Leonard Precision Products Co., 9200 Bolsa Ave., Santa Ana, Calif., or — **Circle Inform-A-Gram No. A52.**



*Did you know that – – –*

**Leading farm machinery makers rely on this precision gage.**



Precision Internal Gage
SIZES FROM 1/8" to 8" AND LARGER

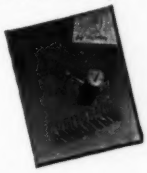
## COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.

**UNIQUE ADVANTAGES**

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging — automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable — no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, guided missile, farm machinery, automotive transmission, household appliance, and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it — investigate and see why.

**COMTOR CO.**
82 Farwell St.
Waltham 54,
Massachusetts



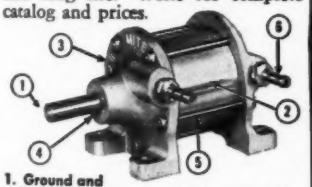
GET THE FULL FACTS — REQUEST BULLETIN 48

CIRCLE INFORM-A-GRAM KEY NO. 2171

# AIR-MITE AIR CYLINDERS

*Low Cost . . . Compact . . . Powerful . . . Rugged*

AIR-MITE Cylinders—made in single or double acting series—in 4 mounting types, are high quality cylinders at a low price. Simple, rugged design and compact construction give them long life, permit easy mounting on jigs, fixtures, tools, or machines. Used wherever power holding, pushing, pulling or lifting is required, AIR-MITE cylinders will meet your most exacting standards of dependability and long life. Write for complete catalog and prices.




1. Ground and polished steel ram
2. Brass, true-bore cylinders
3. High strength aluminum alloy cylinder heads
4. Bronze oilless ram bushing
5. Five steel tie rods
6. Brass hose stems

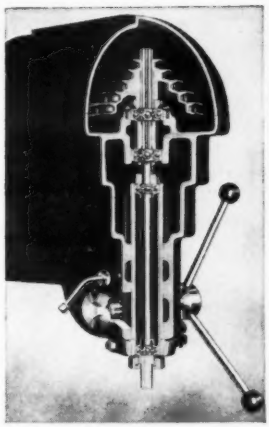
**4 Mounting Types**

**AIR-MITE Devices, Inc.**
4417 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS

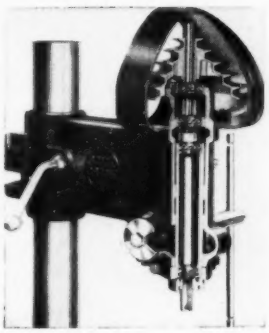
CIRCLE INFORM-A-GRAM KEY NO. 2172

# Look Into These

## and you'll see why BOICE-CRANE knows 15-INCH DRILL PRESSES



*— Specializes in this versatile tool — makes medium duty and heavy duty lines.*



If you want truly accurate holes or threads; "beef" on spindles, bearings, splines, head and column to take continuous production punishment on jobs you have thought impossible with 15-inch drill presses; minimum down time; capacity for larger holes; and/or sensitivity for small wire drill sizes—you need the Boice-Crane 5/8" Helmet Head! It gives you 25% more capacity—is 5/8", not just the customary 1/2" capacity of other 15" (and 14") machines. 64 high and low speed bench and floor models. 1-2-3-4-6-8 spindles. 5 speeds.

If you want a 15-inch, 1/2-inch drill press in the low price range, check the Boice-Crane Challenger, feature for feature, with others in the same price class. Exclusive two-way aliner-belt tensioner. Perfect alignment and tension instantly released for speed changing without wrenches or tools. 6-tooth splined drive. Every splined-drive part made of steel for quiet running and longer life. Four heavy grease-sealed ball bearings. Massive head and positive, easy, quick acting non-mar quill and column locks. 5 speeds in two ranges.

*Available Now!*
through industrial supply distributors in most cities.

FOR 40 YEARS · AMERICA'S MOST IMITATED POWER TOOLS · BOICE CRANE

**BOICE-CRANE COMPANY**
963 Central Avenue • Toledo 6, Ohio

Please send free literature on the Boice-Crane ( ) Helmet Head Drill Presses; ( ) Challenger Series Drill Presses.

NAME.....
FIRM.....
STREET.....
CITY & STATE.....

CIRCLE INFORM-A-GRAM KEY NO. 2173

For Better Knurling

NEW

KNURLMASTER

Hand Knurler

$13.50

No distortion — even on ⅛" stock! MODEL "C"

For small production runs on ⅛" to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened knurls of standard ½" dia. Forged steel frame is self-centering. Write for illustrated folder.

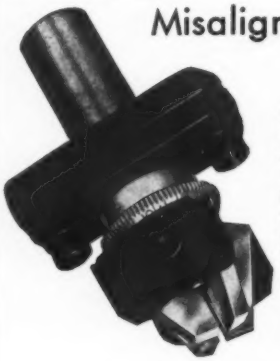
DEALERS INQUIRIES INVITED

ROCKWIN MANUFACTURING CO.
45A Rose St. New York 38, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 2181

Compensates for Spindle Misalignment

KUTMORE ADJUSTABLE HOLLOW MILLS



The Midget Floating Holder Hollow Mill, flange type, has micrometric adjustment, and is designed to permit easy compensation for any spindle misalignment.

WRITE TODAY For CATALOG 28-TD

It shows complete line of adjustable hollow mills. Our engineering department is at your disposal for special requirements.

1625 CLINTON AVE. NO.

CARL WIRTH & SON, INC.

ROCHESTER 5, N.Y.

CIRCLE INFORM-A-GRAM KEY NO. 2182

CENTERLESS DRILL BLANKS

Hardened and Ground High Speed Steel

**STANDARD BLANKS:** Hardened and centerless ground high speed steel blanks carried in stock for your use. Diameters supplied with tolerance of plus .0002.

**SPECIAL BLANKS:** requiring special diameters and lengths furnished promptly. Send us complete information. We will quote promptly.

**USE FOR:** The combination of perfectly hardened and tempered high speed steel produces a tough and hard blank that can be used as PUNCHES, KNOCK-OUT PINS, DOWEL PINS, END-CUTTING TOOLS, GAUGES AND ROLLERS.

*Standard Specification Sheets on Request*

CENTERLESS PRODUCTS COMPANY

27 VERONA AVENUE NEWARK 4, NEW JERSEY

CIRCLE INFORM-A-GRAM KEY NO. 2183

**A Liquid Die Spring** using liquid compressibility replaces heavy duty coil springs in dies. The Liqui Spring illustrated is ¾" dia and 2½" long plus mounting stud. Its 5/16"

stroke with 600-lb preload and end force of 2000 lbs are equal to the force, stroke, and preload of 10 of the same size coil springs. Taylor Devices Inc., 188 Main St., N. Tonawanda, N. Y., or — **Circle No. A53.**

**A Complete Multi-Cam Timer Kit** has been announced by Industrial Timer Corp., 1407 McCarter Hwy.,

Newark, N. J. This basic construction kit contains all the parts for assembling 4 multi-cam timers.

**A Universal Jig Base** has been designed which increases the utility of the turret drilling and tapping machine shown. The base makes possible accurate work positioning under the turret spindles, all of

which work on a common axis. The machine will complete up to 6 different operations with only one handling of the work. Howe & Fant, Inc., 20 Fitch St., E. Norwalk, Conn., or — **Circle Inform-A-Gram No. A55.**

**Nth degree**
*precision . . . for less!*

**SPITFIRE**

**Lapping Machines**
*For every lapping job!*
Whatever your precision finishing requirements, Spitfire has the lapping machine custom designed for your piece parts, your production speed, your cost schedules. For unexcelled quality control at savings—contact Spitfire today!

*The New*
**GYRO-MATIC "21"**
Now . . . automatic flat lapping that saves time, money, work! Push button operation with many outstanding new features . . . produces optical flatness to .0000116!

*"24" Flat Lapper*
Low cost, super fine mechanical finishing. Lapping plate eliminates distortion.

*"18" Flat Lapper*
The scientifically designed features of Model "24" in a money-saving 18" lapping surface.

*Cylindrical Lappers*
Micro-inch lapping of plug gages, cylindrical parts, shoulders, etc. Closer tolerances in 1/3 the time!

*Write today for complete details!*

**SPITFIRE Tool Co.** 2931 N. Pulaski Rd. Chicago 41, Ill.

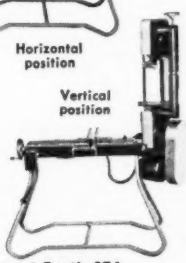
**Visit our booth No. 736 ASTE Industrial Exposition**
CIRCLE INFORM-A-GRAM KEY NO. 2191

**NOW YOU CAN HANDLE METAL CUT-OFF or LIGHT CONTOUR CUTTING**
**. . . with one economically priced saw . . .**

Here's unmatched versatility in a quality built, dual-purpose band saw — the Wells 49-A. TWO saws for the price of ONE!

Use it as an efficient, money-saving horizontal cut-off saw to handle jobs up to 3½" x 6". Then, with one easy motion, convert it to a vertical band saw. Just swing head into upright position — it's ready to use. No tools required! It's handy for cutting angles and slots, and for light contour work.

The Wells 49-A is a real time and money saver in any shop or experimental lab. Write for full details or call your local Wells Distributor.




See us at Booth 274 at the Tool Show

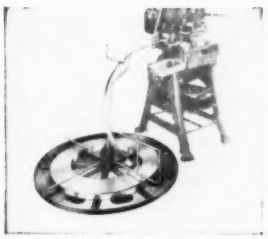
*The Pioneers of Horizontal*
**METAL CUTTING BAND SAWS**
WELLS MANUFACTURING CORP.
1940 CEDAR ST., THREE RIVERS, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 2192

# PRESS ROOM EQUIPMENT

*Low Cost Automation*

Get started for less than $100.00

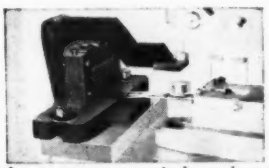


**1. JACO AUTOMATIC STOCK REEL**

. . . no motors, no belts, no sprockets . . . powered by the natural spring of uncoiling stock. Operates without attention or maintenance . . . the loop of stock prevents kickback and overrun. (U. S. Patent)

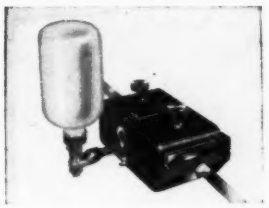
**2. LOW COST JACO-MATIC PRESS FEEDS**

. . . available in a complete range of 4 sizes up to 4" x 4" capacity at prices so low one run can pay for them. Micrometer adjustment to .001". Rugged design proved in 3 years operational testing. Mounts on dieset or table. Powered by the press ram. (Patent Pending)



**3. TWO JACO SCRAP CHOPPERS**

. . . low cost 3" and 6" maximum widths. Save money handling scrap. Interchangeable high speed steel blade saves down time. Powered by the press ram . . . independent of the die. Rugged . . . long life.



**4. NEW JACO OILER-STRAIGHTENER**

. . . low cost . . . does 3 jobs for longer tool life: cleans and lubricates stock, removes "coil-set". Oil reservoir is unbreakable polyethylene; holds 1 pint. (Patent Pending)

***Every JACO product is guaranteed to work on your job or your money back.***

**SEND THIS COUPON FOR FULL DETAILS**

*Yes!* we'd like descriptive bulletins:
1. ☐ 2. ☐ 3. ☐ 4. ☐

MR. _____

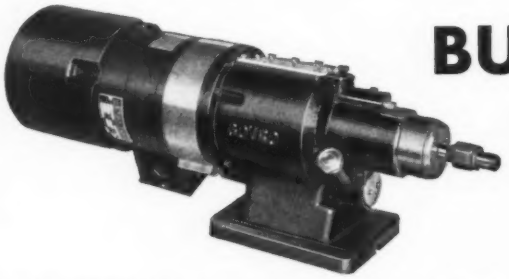
COMPANY _____

ADDRESS _____

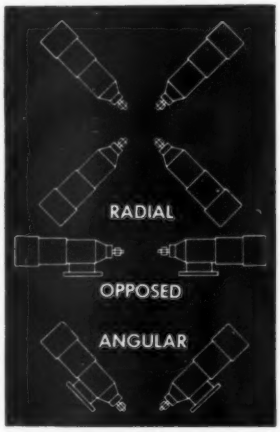
CITY _____ STATE _____

**JACO DEVICES, INC.**
96 HIGH STREET • HINGHAM, MASSACHUSETTS

CIRCLE INFORM-A-GRAM KEY NO. 2193



# BUILD YOUR OWN
## AUTOMATIC DRILLING OR TAPPING MACHINE




With Govro-Nelson Automatic Drilling and Tapping Units, together with the bases and electrical controls which we can supply, you can build yourself an automatic drilling or tapping machine at substantially lower cost than a special machine.

Any number of units may be employed. Examples of the various ways in which they may be arranged are shown at the right.

### DRILLING UNITS

The Drilling Units are made in several sizes with spindle speeds from 1100 to 3450 RPM. Drill Units have full Hydraulic Control with external adjustment for the rapid approach, the rate of feed and the length of stroke. Suitable for drills up to ⅜", depending on material.

### TAPPING UNITS

The Tapping Units are available in two sizes with 550 and 1725 RPM spindle speed. Features include no clutch and no lead screw and automatic adjustment for various leads. Suitable for tapping 0-80 to ⅜-16, depending on material.

**Write for Literature**

*Automatic* **DRILLING UNIT**

**AT THE ASTE SHOW**
**BOOTH No. 1226**

**GOVRO-NELSON CO.**
*Machinists of Precision Parts for 33 Years*
**1933 ANTOINETTE DETROIT 8, MICH.**

CIRCLE INFORM-A-GRAM KEY NO. 2201

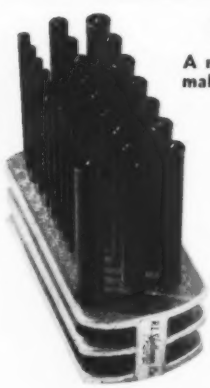
# Expanding Mandrels

**Accuracy 001" - No Distortion**
**No Slipping - Everlasting**

**K.O.LEE CO.**
ABERDEEN, SOUTH DAKOTA

*If it's made by* **Lee** *it's a* **"Knock-Out"**

CIRCLE INFORM-A-GRAM KEY NO. 2202



## SPELLMACO SPOTTERS

**A matched set of transfer punches for toolmakers, machinists and tool cribs.**

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel carefully heat treated and tempered for long life. .0025 undersize to facilitate use—black oxide finish.

**Set No. 3-17: 28 punches with indexed stand—Sizes 3/32" to ½" by 1/64" plus handy 17/32" size—length 4⅞". PRICE only $16.80**

**Single size available.**

**R. L. SPELLMAN CO. • Urbana, Ohio**

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## INDICATING MICROMETER COMPARATOR

*has the VISIBLE feel*

**A RIGHT HAND TOOL**
*Release button for movable Anvil on RIGHT Hand side enables you to hold tool the conventional way.*

**NEW—**
Resetting to Zero in 5 seconds.

Quick adjustable tolerance hands.

Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness & Taper.

## The New No. 101 MAUSER VERNIER CALIPER

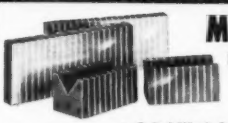
- Quick acting cam lock
- Long open face slide
- Measuring capacity 5-5/16" outside, inside and depth
- 3 graduations: 1/1000" - 1/128" and 1/10 mm in back
- Specially long Vernier to read the thousandths
- Hardened Phosphor-Bronze adjustable gib retains accuracy

**MADE ENTIRELY OF STABILIZED, RUST-RESISTANT STAINLESS STEEL**

The fine finish will not tarnish or deteriorate in many years of use.

New dull chrome Vernier slides finished for easy reading at no additional cost.

## SPEED SURFACE GRINDING SET-UPS WITH



**MAGNE-BLOX**
Laminated Parallels
V-Blocks &
Angle Irons

**UNIVERSAL SET**
**$22.25** In Case
Code GANBO

- Grind Work Square
- Grind Work Parallel
- Hold Round Pieces
- Save your Magnetic Chucks
- Eliminate Clamps
- Eliminate Holding Devices

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COMPLETE LINE OF PRECISION INSTRUMENTS
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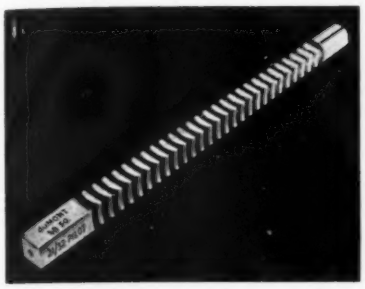
CIRCLE INFORM-A-GRAM KEY NO. 2204

## TOOL SHOW PREVIEWS

- The new line of standard stock "Minute Man" square and hexagon push type broaches will be exhibited by The duMont Corp., Greenfield, Mass., at Booth 1106. Starting with a round pilot, these broaches will finish square (see illustration) and hexagonal holes

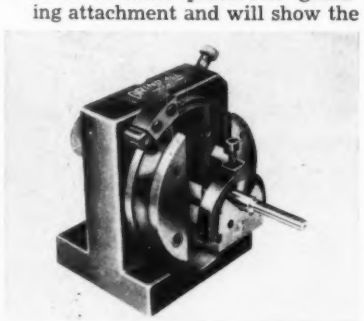


in a drilled, reamed or cast bore in one pass. They may be used in either a hand-operated arbor press or a hydraulic press and are available in eight sizes, for 3/16" to ¾" holes. Also on exhibit will be duMont's line of production type keyway broaches. (S88)

- A complete line of portable air tools for industry will be exhibited in Booth 674 by The Rotor Tool Co. of Cleveland. Special emphasis will be put on assembly tools, and screwdrivers, nutsetters, drills, and impact wrenches. There will also be a separate grinding booth. (S89)

- Method X tool sharpener and Firthite Thriftools will be featured in Booth 528 by Firth Sterling Inc., Pittsburgh, Pa. The tool sharpener is an electro-spark metal remover for modifying and sharpening cutting tools. Available in sizes as small as ⅜", Thriftools cut costs on machining operations. (S90)

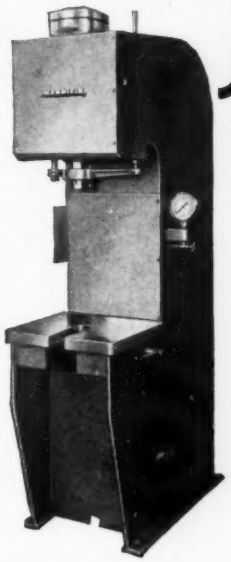
- Harig Mfg. Corp. of Chicago has designed the Grind-All fixture to meet the need for a faster and more versatile perforator grinding attachment and will show the



unit in Booth 1718. It is particularly adaptable for carbide grinding because of its exclusive radius generating feature. (S91)


PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



| | |
|---|---|
| 1-TON | $ 552 |
| 2-TON | $ 627 |
| 5-TON | $1,286 |
| 8-TON | $1,581 |
| 10-TON | $1,855 |
| 25-TON | $3,681 |

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

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HANNIFIN CORPORATION, 563 S. WOLF ROAD, DES PLAINES, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 2211

NU-CUP SET SCREWS have greater holding power

the shaft tells the story!

Full Circle impression of Nu-Cup . . . greater holding power.
Half-Circle Skid Mark of Conventional Screws . . . permits slippage.
And This Is The Reason:
Nu-Cup 42½° Sharper-Angle Point Permits Higher Setting Torques
Higher Torques Impossible with Conventional Wide-Angle Point

Without cost or obligation, send for "Nutcracker" Testing Tongs to compare Nu-Cups, yourself, with set screws you now use. See with your own eyes conclusive proof of Nu-Cup's greater holding power. See how Nu-Cups end slippage, screw heads cracking, and other set screw troubles.

Nu-Cup now available with Hex Socket Head . . . as well as slotted or slabbed head.

No need to write a letter. Simply fill out and mail the coupon at the right, to get your "Nut-Cracker" Nu-Cup Tester. Send for it now.

Set Screw & Mfg. Co. 158 Main St., Bartlett, Ill. (Chicago suburb)

1137 PDM

*We specialize in Solving Puzzling Set Screw Problems*

Use This Convenient Coupon

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I would like to receive without cost or obligation, Nu-Cup "Nut-Cracker," to make my own comparison test of holding power of Set Screws.

INDIV. NAME.....

COMPANY.....

ADDRESS.....

.....CITY.....ZONE...STATE.....

CIRCLE INFORM-A-GRAM KEY NO. 2212

*Gage Company* PRECISION PLASTIC

## COMPARATOR SCALES

Non-breakable...accurate...designed for making quick measurements at scale on projectors and comparators without any movement of machine or work.

An unexcelled tool for use in drafting and constructing scale layouts for comparator chart use. All standard magnifications and various styles for every application.

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**GAGE COMPANY**

**BATTLE CREEK, MICHIGAN**

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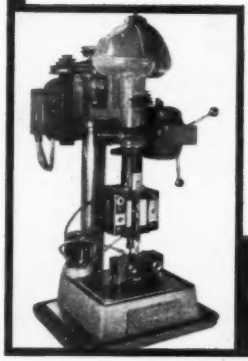
*Commander* LEAD-MATIC *Tapper*

*Automatic Tapper with Lead Screw*

FOR HIGH PRODUCTION PRECISION TAPPING

- Precision Ground Lead Screws Assure Finest Threads
- Electrically Controlled Cycle or Jog Tapping Action
- Hand, Foot or Fixture Switch Control
- Easily Adapted to Any Drill Press
- Range #0 to ¾"



Built for high production tapping . . . precision or otherwise, the Commander Lead-Matic Tapper makes any drill press a precision tapping unit, even with inexperienced operators. Electric control of Cycle or Jog tapping action provides versatility to handle any job . . . automatic tap reversal eliminates drill press motor reversing and speeds tapping. Compact, ruggedly built, easy to operate, the Commander Lead-Matic Tapper will cut your tapping costs and reduce rejects to a minimum.

*Write for illustrated circular and name of nearest Distributor.*

**Commander MFG. CO.**

4228 W. KINZIE ST. • CHICAGO

*PRODUCT OF COMMANDER... BUILDER OF PRODUCTION TOOLS*

See us at Booth No. 800 A.S.T.E. Show
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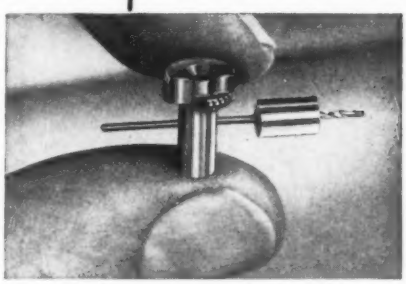
CIRCLE INFORM-A-GRAM KEY NO. 2223

## *ULTRA PRECISION BUSHINGS . . .

For gauge assemblies, flow orifices, wire drawing dies, etc. Guaranteed accuracy to .0001 in bores up to ⅜" long.

★

**With Micro Drill Guides**



## *Special Holes are Standard!*

No change in price or delivery for metric and special hole sizes in STANDARD MICRO DRILL GUIDE RANGE OF #80 to 3/32" in listed body sizes.

### *LONGER LIFE*

No counter bore . . . diamond lapped hole with full length drill bearing.

### *Also Available*

- Special Micro Drill Guides with body sizes other than those listed and hole sizes not in the standard #80 to 3/32" range.
- Job micro-drilling of your parts.
- Engineered MICRO-TOOLING, drills, jigs, collets, etc.

MICRO DRILL GUIDE

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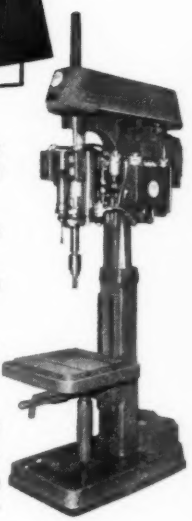
CIRCLE INFORM-A-GRAM KEY NO. 2222

**SETS NEW PRODUCTION RECORDS!**

## BECKETT *Air Thrust* DRILLING AND TAPPING MACHINES



- You tap *direct* from drill chuck or any standard multiple drill head.
- No clutch, leadscrew or tapping head required.
- Duplicates the class thread ground into the tap.
- For drilling, thrust is easily adjusted to provide exact drill point pressure.
- Machine is quickly changed from drilling to tapping or allied work.
- Get full details. Find out how a manufacturer of precision aircraft parts reduced rejects due to tapping from 12% to less than ½ of 1% — and doubled tap life — with Beckett machines. The investment is low and deliveries are good. Write for Bulletin 50.

**BECKETT-HARCUM CO., INC.**

**1096 Wayne Road, Wilmington, Ohio**

CIRCLE INFORM-A-GRAM KEY NO. 2224

## TOOL SHOW PREVIEWS

- Measurements to .000003" and/or 0.1 second of arc can be made with an extraordinary portable Alignment Interferometer to be featured in Booth 1032 by Bausch & Lomb Optical Co. of Rochester, N. Y. The unusual instrument provides a tool for the production

engineer to work to tolerances never before attained outside the laboratory. Other Bausch & Lomb products to be demonstrated include stereomicroscopes, wide field tubes, macroscopes, and bench comparators. (S92)

- Among the new products to be demonstrated by Scully-Jones & Co. of Chicago at Booth 448 are "Safe-Torque" tap drivers in non-reversing and reversing types, "Safe-Torque" nut runners, "Roll-Lock" and "Better-Hold" chucking tools, and Scully-Jones recessing tools. The "Scully-Drift" for ejecting taper shank tools without damage to spindle, bearings, and cutting tools. The "Toolitrol" board will also be displayed. (S93)

- Two basic types of standard mass production machine bases for transferring workpieces from one set of tooling to another are to be displayed by Ferguson Machine & Tool Co., St. Louis, at Booth

350. The "Intermittor" (shown) is a high speed precision index table that attains production speeds as high as 30,000 pcs/hr. The "Trans-O-Mator" is a standard straight line transfer machine. (S94)

- A line of pneumatic grinders will be displayed by M-B Products of Detroit in Booth 557 along with automatic air line filters, regulators, lubricators, and air traps. (S95)

## CONTRACT TOOLING AND PRODUCTION

### Illinois

**DRESEL-BETZ CO.**
Belleville, Ill.
Designers and Manufacturers of Tools, Dies, Jigs, Fixtures, Metal Stampings.

### Michigan

**DAVIS TOOL and ENGINEERING CO.**
19250 Plymouth Road, Detroit, Michigan, VErmont 5-6000. Tools and Dies, Special Machinery. Sheet Metal Stampings and Assemblies.

### New York

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**CLEVELAND UNIVERSAL JIG COMPANY**
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**DESIGNERS AND BUILDERS**
Jigs and Fixtures Special Machines
Production Engineering
Complete Plant Routing and Tooling

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Dies, Tools, Jigs, Fixtures, Light Stampings, Special Machinery Manufacturing.

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**NOBLE & STANTON, INC.**
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**A. P. SCHRANER & CO.**
3338 Payne Ave., Cleveland, O., HEnderson 1-8644. External Cylindrical Lapping Machines, Special Machinery, Tools, Dies, Jigs, Fixtures.


**DO YOU MAKE?**
— Plastic, Rubber or Glass Molds
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The REGENT
*Fluid-Motion*
**DUPLICATOR TABLE**
REGENT

39 out of 40 plants who purchased Regent Duplicator Table on a 15-day trial, sold themselves on its faithful performance.

**MOUNTS ON ANY BRIDGEPORT MILL**

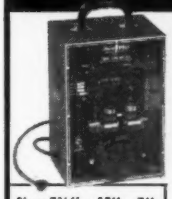
Capacity 6" x 6" — 1 to 1 ratio with master. 2 or 3 dimensional with greatest accuracy. Single lever table control. Table "floats" on precision balls.

**SOLD ON 15 DAY TRIAL BASIS**

**J. M. KALINS & CO.**
113 E. Washington Ave., Bridgeport 8, Conn.

CIRCLE INFORM-A-GRAM KEY NO. 2231

**Portable Band Saw Blade Welder**
ASSURES PERFECT, UNBREAKABLE WELDS EVERY TIME!
Employs New *Vibra-Forge* Principle!
BREN-WELD MODEL M 3/4" CAPACITY



Built-in grinder removes flash . . . Double gauge checks flat saw widths . . . Butt-welds all saw blades from 1/16" to 3/4". Handles intricate tool and die and power cut-off saws. Additional features of this fully-automatic welder:

- PERFECT WELDS
- NO BREAKAGE
- NO FAILURES
- WEIGHS ONLY 35 LBS.
- OPERATES ON 110 V, A.C.
- UNCONDITIONALLY GUARANTEED

Size: 7¾" x 12" x 7"
LIST PRICE $169.50
(F.O.B., L.I.C., N. Y.)

24 HOUR DELIVERY FROM STOCK
*Write For Complete Details Today*

KASSON PRODUCT
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BRENNEN, BUCCI & WEBER INC.
Integrity Since 1919
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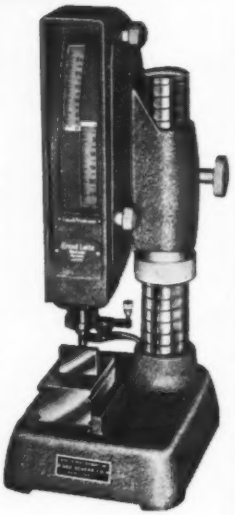
CIRCLE INFORM-A-GRAM KEY NO. 2232

# LEITZ OPTI-COMPARITOL

**An amplifying gage of semi-optical design for gaging outside dimensions, lengths and thicknesses precisely and rapidly.**



Its unusual design makes it sensitive enough for the finest tool and gage inspection, with the necessary ruggedness for fast, day in - day out - production inspection.

Brightly illuminated screen makes the readings unmistakable at a glance. Adjustable red tolerance shield shows undersize pieces and green tolerance shield shows oversize pieces.

**If it's White - It's Right**

**Reads in .00005" - Range ± .005" Capacity 6"**

***WRITE FOR COMPLETE LITERATURE***

**In certain territories inspection may be arranged**

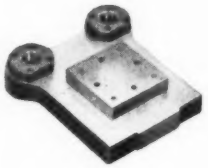
## Geo. SCHERR OPTICAL TOOLS, Inc.

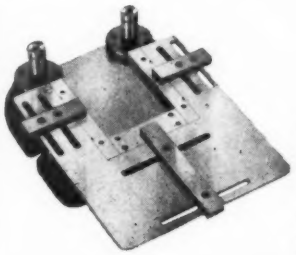
**200-T LAFAYETTE STREET • NEW YORK 12, N.Y.**

CIRCLE INFORM-A-GRAM KEY NO. 2241

## Punches and Dies

# Notching Die with Gauge Table





**Standard stock sizes 4", 5" and 6". Lick those Notching Problems QUICKLY. Gauge table and gauging bars provide accuracy and speed with easy adjustment.**

**This is another of the many different kinds of punches and dies in stock or made to order for foot, hand or power operation. Precision made from high grade tool steel. Also adaptors and die shoes to convert your press.**

## Immediate Delivery

**What are your punch and die needs? Consult us about your problems. Prompt service on "Specials" made to your order.**

**Send for free illustrated catalog No. 154 AF. Net prices shown.**

## WARD Machinery Co. 564 West Washington Chicago 6

CIRCLE INFORM-A-GRAM KEY NO. 2243

# KENCO 15-ton ELECTRO-SAFE – the safest punch press you can buy!

Single-trip control buttons are widely spaced, to keep hands clear of the danger zone. Operator must push **both** buttons at once... hold them until stroke reaches bottom, then release both buttons to start new cycle. Fail-safe operation. Impossible to "fudge." Impossible for press to double trip.

**VERSATILE CONTROLS**—You can change from "single trip" to "continuous stroke," or "inching" by merely turning a dial. You can change timing in seconds. No flywheel... no clutching. Write for details.

## KENCO MANUFACTURING CO.

*Mfrs. of Precision Machinery and Accessories*

**5211 Telegraph Road, Los Angeles 22, California**

***See our Display Booth 618 — A.S.T.E. Show***

CIRCLE INFORM-A-GRAM KEY NO. 2242

# THE ONLY parts feeder of its kind!

*feeds to 200,000/hr.... endless range of products... hopper, track, release-standardized!*

# Feed-A-Matic

The FEED-A-MATIC is the only small parts feeder fully standardized throughout. The hopper, feeding track, and release control are all engineered to operate with *all* products of any size or shape.

That's why changeover is only a matter of adjusting a few screws—why no extra change parts are required.

Send us samples, today, of parts you wish to feed or count and we will evaluate your problem immediately.

***All these features!***

- **Handles widest range of sizes and shapes.**
- **Universal feeding track—handles complete range.**
- **Changeover in 5 min.—no change parts required.**
- **Orients, feeds, counts and releases.**
- **Positive, gentle action—no jamming.**
- **GUARANTEED OPERATION.**

## U. S. ENGINEERING CO.

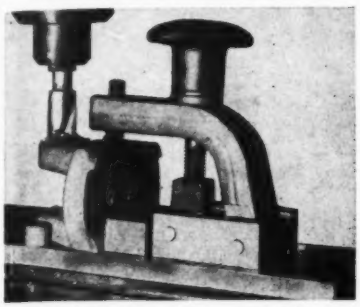
**Builders of Feeding, sorting, counting machines.**

**40-21 22nd ST., LONG ISLAND CITY, N. Y.. PHONE: ST 6-7848**

CIRCLE INFORM-A-GRAM KEY NO. 2244

## TOOL SHOW PREVIEWS

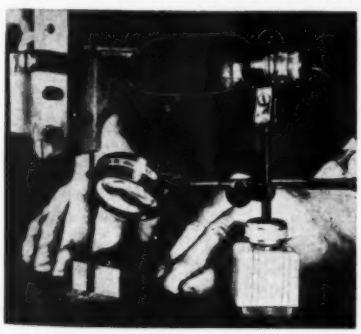
- New retracting clamps manufactured by Lodding, Inc. of Worcester, Mass., and shown in Booth 735 are furnished in both air and hand operated models, in four



sizes of four types, and for all work. Lodding jack assemblies, which make obsolete such things as screw jacks and shims, will also be displayed in Booth 735. (S96)

- Standard cataloged power cylinders with many new quality features will be shown by Miller Fluid Power Co., Chicago, at Booth 429. The features include case-hardened, chrome plated piston rods; Teflon rod wipers and hydraulic rod seals; rust-resistant finish on cylinder heads, caps, mountings, pistons, followers, tie rods, and the unplated portions of the piston rods. The recent Miller development of double-acting reciprocating boosters, which with shop air cycle continuously a constant flow of oil for hydraulic cylinder operation, will also be displayed. (S97)

- Here's a magnetic base tool that combines pin-point lighting with powerful magnification. Tiny-Titan No. 220 is designed to mount flat or down to ¾" round surfaces and therefore can be



mounted where needed. The photo shows the unit being used during a sawing operation. This magnetic base tool will be introduced and demonstrated by Enco Mfg. Co. of Chicago at Booth 651. (S98)


HANDLING SMALL PARTS?

then handle them automatically with SYNTRON

PARTS FEEDERS

Small Parts— As you want them
Where you want them
When you want them

Now Syntron not only offers you an automatic, controlled method of handling, positioning and feeding of small parts, but they can provide, within reasonable limits, gravity feed tracks that will deposit the part in placing devices, indexing tables, dies, cavities, etc.
Electromagnetic vibration can do the work of many hands — write for free, illustrated bulletin.

SYNTRON COMPANY
341 LEXINGTON AVENUE HOMER CITY, PENNA.

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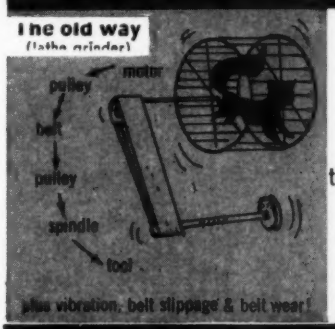
Take the direct approach to versatile tooling!

The old way (lathe grinder)




plus vibration, belt slippage & belt wear!

the Precise way

. . . in one powerful electric unit, easily mounted, with variable speed control!

REPLACE OLD-FASHIONED LATHE GRINDERS WITH PRECISE POWER QUILLS!

Power Quills is a new name for a new tool that outperforms and outlasts lathe grinders, and saves fortunes through increased tooling versatility! Precise Super 60 Power Quills are unlimited in application, can be used on any machine and mounted in any position to mill, grind, finish, or micro-mill any material with abrasive wheels and tungsten carbide tools. And look at these exclusive Power Quill features:

OPERATE AT SPEEDS UP TO 45,000 RPM, DEVELOP FULL ½ H.P.
CAN FINISH TO 5 MICRO INCHES AND .0001" TOLERANCES ON PRODUCTION MILLING AND GRINDING WITH CARBIDE TOOLS.
MOTOR AND SPINDLE ARE IN ONE COMPACT, DIRECT-LINE, SOLID STEEL PACKAGE WITH GREATER SPEED (45,000 RPM) TORQUE, ACCURACY, AND RIGIDITY.
REMOVE METAL FASTER, BETTER SURFACE FINISHES, INCREASE TOOL LIFE.
MOUNT IN ANY POSITION, ON ANY MACHINE, WITH PRECISE MOUNTS — FAST!

Attach this ad to your letterhead for FREE demonstration or literature!

See us at Booth 296 A.S.T.E. Show

PRECISE PRODUCTS CORP.
1341 CLARK STREET, RACINE, WISC.
Quality and precision since 1882
Grinder-Millers - Power Quills - High RPM Milling Machines - Mounts and Accessories - Rotary Tools

Precise

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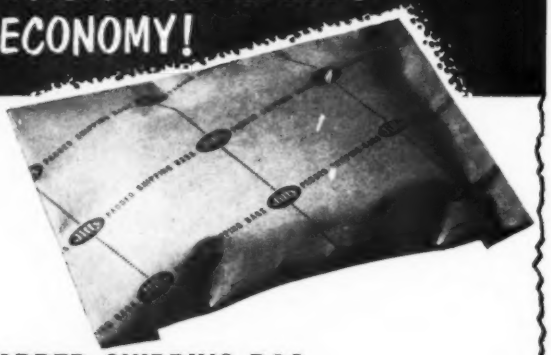
Engineered for SHIPPING PROTECTION!
Designed for PACKAGING SPEED!
Planned for ECONOMY!



the JIFFY PADDED SHIPPING BAG

Millions of Jiffy Bags—carrying a large variety of soft goods, semi-fragile or non-fragile merchandise—are being shipped to all parts of the world. No matter how distant or rough the journey, the built-in cushioning of a Jiffy Bag protects the contents from damage.

Jiffy Bags are as easy to use as an envelope. Just insert contents—staple or gum tape to close—and your merchandise is ready to go!

**Available in 8 standard sizes. FREE SAMPLES.**

Also manufacturers of Jiffy Macerated Paper Pads, Blankets, Liners. Rugated Paper Pads, Cellulose Wadding, Indented Paper Pads.

Jiffy

Distributors in Principal Cities

JIFFY MANUFACTURING COMPANY
368 Florence Ave. Hillside, N. J.

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COLLINS

MICROFLAT®

BLACK GRANITE

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- ANGLE PLATES
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COLLINS MICROFLAT surface plates and precision accessories offer the user life-time accuracy at a minimum cost

All sizes—
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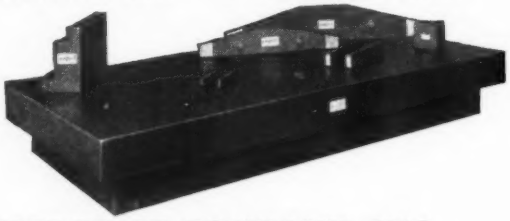


COLLINS MICROFLAT COMPANY, INC.
2326 East 8th Street • Los Angeles 21, California

CIRCLE INFORM-A-GRAM KEY NO. 2262

## TOOL SHOW PREVIEWS

- With carbide hand files, production filing and deburring become a reality. These tools and carbide Econo-Sinks will be featured

by Severance Tool Industries, Inc., Saginaw, Mich. In addition, free hand grinding methods will be demonstrated in Booth 289. (S99)

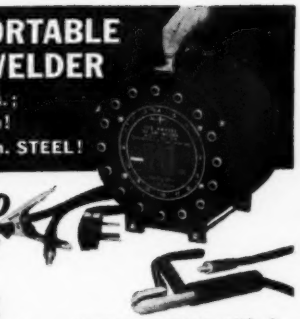
- The Besly-Metro line of gages and carbide tipped tools will be shown for the first time at the Booth 637 by Besly-Welles Corp. of Beloit, Wis. Metro Tool & Gage Co. of Chicago formerly made the Besly-Metro plug and ring gages and master setting discs and wires. (S100)
- A multi-purpose master spacer that indexes work for a variety of machining jobs will be introduced by Erickson Tool Co. of Cleveland. It accurately positions work ordinarily done by jigs

and fixtures. Designed to be used vertically or horizontally, the master spacer assures outstanding performance under heavy helical cuts and slow feeds. It will be on display in Booth 652. (S101)

- Allegheny Ludlum Steel Corp. of Pittsburgh will display a tool steel exhibit in Booth 588 using test specimens of etched discs made by consutrode remelting. Consumable electrode vacuum remelting (consutrode method) is a commercial process for producing high purity metals. In addition, high speed steels of the DBL-2, LMW, VLM, and other grades will be on display in Booth 588. (S102)

## FIRST TRULY PORTABLE 200 AMP. ARC WELDER

Weighs only 65 lbs.; carry it to the job!
WELDS 2 PIECES OF 1½ in. STEEL!



BREN-WELD TRADE MARK
MODEL 200 AW

Featuring the new

**TRANSOIDAL**
(A development of the toroidal coil)
**TRANSFORMER**
(Fully protected by patent applications)

**Obsoletes All Other Welders of Comparable Rating!**

The portable BREN/WELD does the work of conventional welders 4 to 5 times its size and weight. Eliminates the necessity to transport bulky equipment or heavy parts to be welded.

BREN/WELD handles electrodes from 3/32" through 5/32"; it has adjustable arc voltage for various arc characteristics.

BREN/WELD is ideal for plant production and maintenance, construction work, railroads, on the farm and in home workshops.

**Comes complete with 2-10 ft. cables, ground clamp and electrode holder.**

● 200 Amp.—At 50% Duty Cycle ● 110/220 Volts A.C., 50/60 Cycles ● Also Available For 220/440 Volts ● Simple To Use—Fully Guaranteed ● Has An 80% Power Factor.

11" x 12" x 7½"
List Price $169.50
F.O.B., L. I. City, N. Y.
Lowest Price on Market for Comparable Ampere Rating

**FREE!** For details of free trial offer and folder see your dealer or write directly.

**24 HOURS DELIVERY FROM STOCK!**

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Integrity Since 1919
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A KASSON PRODUCT

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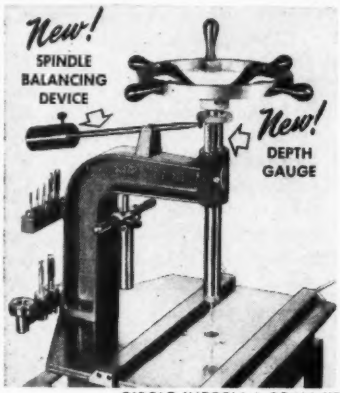


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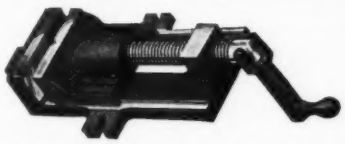
## TAPPERS

Set new standards for cut thread accuracy. Are universally used in the Tool Room and for small lot production. No set up. Always ready for instant use.

Write for illustrated circular showing all models.

**LASSY TOOL CO.**
Plainville, Conn.

CIRCLE INFORM-A-GRAM KEY NO. 2272



## Cut Costs!

with the NEW YOST DRILL PRESS VISE

- Developed expressly for use on drill press operations.
- Does away with special and costly jig fixtures.
- Available in two sizes:

| No. | Jaw Width | Max. Opening |
|---|---|---|
| 1D | 3½" | 4 " |
| 2D | 5 " | 5½" |

*Write today for bulletin on the extensive Yost line.*

**YOST MFG. CO.** 124 Grant St., Cambridge Springs, Pa.

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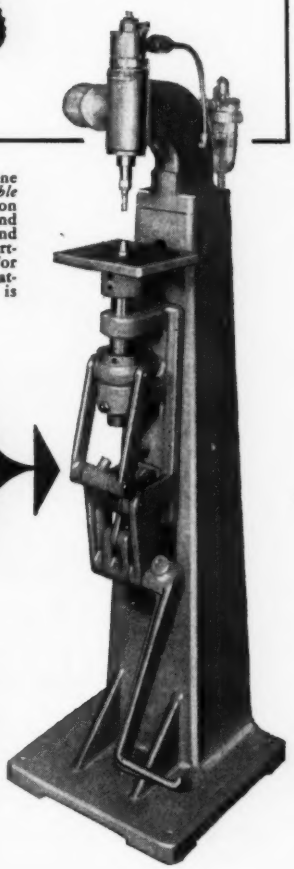
## THE ANSWER to some difficult RIVETING PROBLEMS

**For Example:**

This toy has an unsupported axle ⅛" diameter by 4¼" long. The Hill Riveter is able to pein it over snugly WITHOUT DISTORTION in a timed cycle of 2½ seconds using 15 psi air.



This air-operated riveting machine produces *accurately controllable* results that cannot be obtained on ordinary machines. It is fast and efficient, extremely versatile, and easily adaptable for either short-run or mass-production jobs. For regular solid riveting, it is unbeatable; for difficult problems, it is *The* Answer.

**THE HILL PNEUMATIC RIVETING MACHINE**

Essentially, the machine consists of a revolving, air operated, reciprocating hammer, working against an anvil which is adjustable in a rigid bracket. Many important details have been worked out for convenience, for neat appearance, for long life, and for superior performance. *For all details, and complete specifications, write for free bulletin: "High Speed Production Riveting."*

**HILL MACHINE COMPANY**

1301 EDDY AVE., ROCKFORD, ILLINOIS

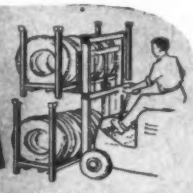
CIRCLE INFORM-A-GRAM KEY NO. 2274

JARKE MODULAR STORAGE SYSTEMS

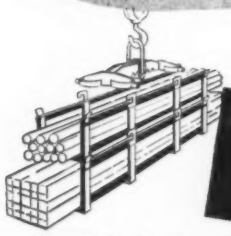
Increase Storage Efficiency
Save Time, Save Labor, Cut Costs

Jarke "Mini-Module" prefabricated storage racks give you storage when you want it, where you want it. Temporary or permanent. Simple to set up or take down, no bolts, no tools, no fittings. Special "nesting" caps provide fast stacking and insure rigid, no-slip interlocking tiers. Lightweight, easy to handle. Sturdy steel construction.

WIRE COIL RACKS



For stacking coiled material. Four-way entry for fork truck, open ends for ram-type deposit of coils. Nesting caps insure fast easy stacking.




For safer stock transport. Unique crane grab permits load centering and rapid fool-proof engagement. Automatic grab also available.

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5407 N. Broadway · Chicago 40, Illinois
Manufacturers of
Portable Storage Racks,
Steelmobile, Scrapmobile

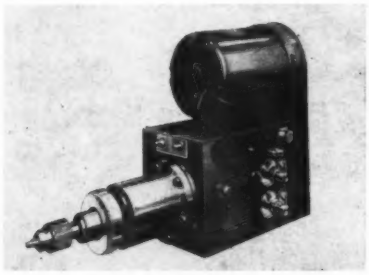
CIRCLE INFORM-A-GRAM KEY NO. 2281


## TOOL SHOW PREVIEWS

- Hundreds of actual job samples of various short run stampings can be seen in Federal Tool & Manufacturing Co.'s Booth 170. They are representative of what can be accomplished through short run stamping processes. Included in the samples are parts stamped out of steel, stainless steel, aluminum, copper base alloys, and phenolics. (S103)

- A unique Red Ring gear gaging and sorting machine, as well as a wide variety of broaches and broaching fixtures, will be featured in Booth 816 by National Broach & Machine Co., Detroit. Model GRD gear gaging and sorting machine will be checking and sorting small automotive pinions automatically for tooth size at the exhibit. The machine will have a transparent plastic cover and mirror arrangement to show how the gage checks parts to tenths of a thousandth accuracy, sorts them according to undersize, oversize or "OK" specifications, and shuts down a gear production machine if more than a given number of rejects of a specific type are successively produced. (S104)

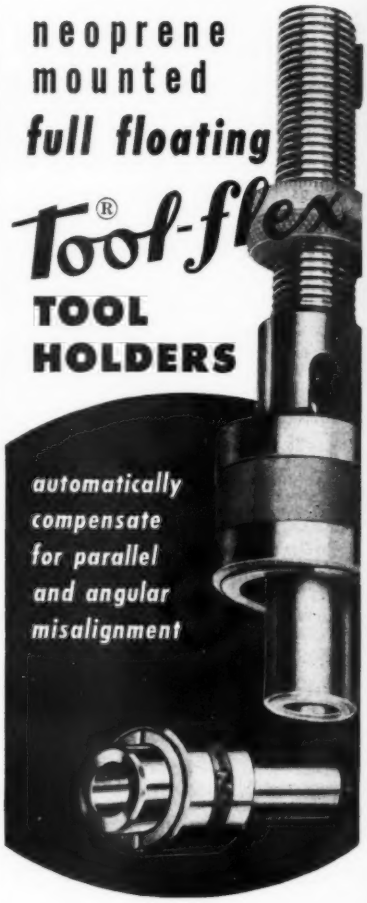
- The new Drill'N'Tap is an automatic unit that drills or taps by merely flipping a switch on the furnished control panel. No special tapping attachment is necessary. In operation, the motor,



controlled by the panel, automatically reverses at pre-set depth to withdraw the tap, then reverses again at the top of the stroke for the right rotation. The unit is to be featured at Booth 678 by The Dumore Co., Racine, Wis. (S105)

- The pneumatically operated head of American Pullmax's new trimmer can be raised 2" to accommodate bulky material quickly and easily. It comes equipped with guide bars that can be detached when edge trimming large stampings or center cutting deep drawn stampings. The trimmer will be displayed by American Pullmax Co., Inc., Chicago, at Booth 689. (S106)


neoprene mounted full floating Tool-flex® TOOL HOLDERS




The oil, heat and wear resistant Neoprene insert, found only in "Tool-flex", provides a universal float that corrects for both parallel and angular misalignment. This assures quick set-ups and minimizes scrap due to bell mouthed and oversized holes or torn and oversized threads. By floating reamers, taps, etc., in a cushion of Neoprene, tool life is increased. Available in a range of sizes and models to suit any requirements, including close centers and Acme threaded shank for multiple spindle setups. "Tool-flex" holders are fully guaranteed.

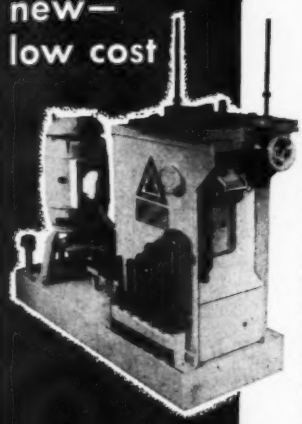
*Write Department TP3 for information*

Visit our booth No. 389, ASTE Industrial Exposition Chicago International Amphitheatre, March 19 - 23

BURG TOOL
MANUFACTURING COMPANY, INC.
15001 SO. FIGUEROA STREET
GARDENA, CALIFORNIA

CIRCLE INFORM-A-GRAM KEY NO. 2282

new—
low cost



# HYDRAULIC KEYSEATER

ONLY WITH BLISS' new Hydraulic Keyseater can you get such a size range *from one machine*—¼" to 2" wide, to 12½" long, standard or tapered. It's easily set up for short or long production runs in small, medium or large plants, warehouses, maintenance departments. What's more, no foundation is needed. Speeds range up to 35 spm; heavy-duty hydraulic system is to JIC specs. All adjustments are readily accessible. Seven cutter bars, with standard tool bits, are also available. Special attachments permit internal spline cutting.

Get all the cost-cutting, time-saving facts by writing today for Bulletin 34—

- fast set-up—saves time and money
- low cost operation—uses standard tool bits
- heavy-duty hydraulic circuit—assures accurate keyways
- compact, 21" x 61"—no special foundation
- versatile—cuts standard, tapered keyways; internal splines

BLISS
SINCE 1832

E. W. BLISS COMPANY
1132 North Seventh Street
San Jose, California

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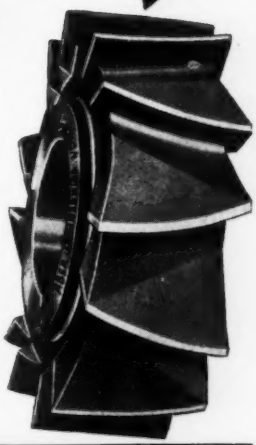
ABER
# Curved Tooth MILLING CUTTERS ARE Better...

## here's 5 reasons Why

1. Give More Accurate Control of Limits and Finish
2. Elimination of Chatter and Breakage
3. Extended Cutter Life
4. Better Performance
5. Increased Production



*Patented Curved Tooth Design* of all *Aber Cutters* permits faster, easier operation, because the curve of the tooth face is built up and strengthened at the corner of the tooth which first enters the cut. This makes possible a *SHEARING ACTION* and eliminates the shock of contact with the work. Dissipation of heat is faster, eliminating friction. . . . Write today for complete information.

FREE DATA on "How to Sharpen Curved Tooth Milling Cutters".

ABER ENGINEERING WORKS
WATERFORD, WISCONSIN

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# Check This!

# S&E

## SOLID CARBIDE DRILL BUSHINGS

ALL SIZES
ALL TYPES

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Users report S & E Solid Tungsten Carbide Bushings outlast steel bushings 50 to 1. Precision ground and lapped to exacting finish and tolerances, fabricated to A.S.A. Standard Designs.

Special S & E Solid Tungsten Carbide Drill Bushings are also available.

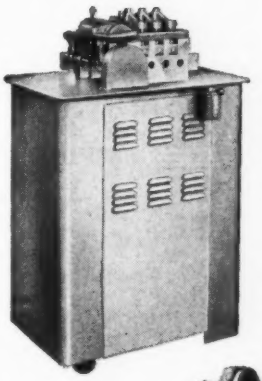
S&E MACHINE PRODUCTS, INC.
Sales Offices in Principal Cities
Plant and General Office: Bridgeport, Mich.

CIRCLE INFORM-A-GRAM KEY NO. 2292

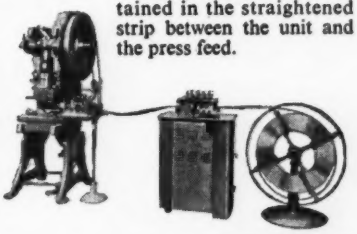
# Economy · Dependability

# WITTEK

## STOCK STRAIGHTENERS



Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes—Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.

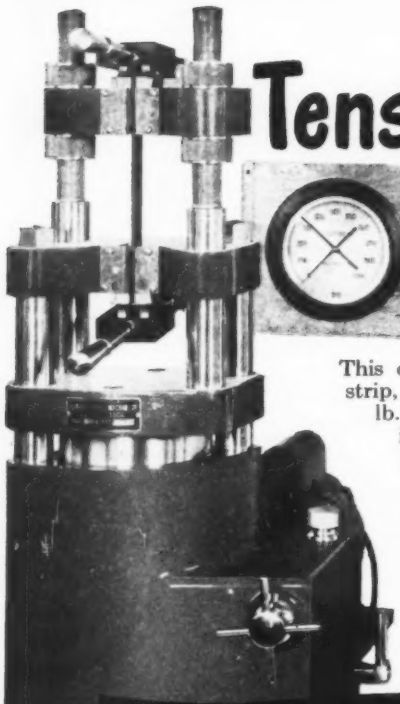
5577

Write for full particulars

WITTEK Manufacturing Co.
4323 W. 24th Place • Chicago 23, Illinois

Production Feeding Equipment

CIRCLE INFORM-A-GRAM KEY NO. 2294



# Tensile Testing

**Fast! Accurate! Easy!**

This compact machine tests spotwelds, strip, wire, anything within its 20,000 lb. capacity. Hydraulically powered, it has an easily controlled ram, self-acting specimen grips that are open sided for easy specimen insertion. This tester, Model ST-1, is adjustable to take specimens 5" to 9" in length. Various load gauges, grips, and other modifications are available.

*Write for more information – give us your requirements.*

**DETROIT TESTING MACHINE COMPANY**

9386 Grinnell Ave., Detroit 13, Mich.

CIRCLE INFORM-A-GRAM KEY NO. 2301

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Take the GLARE out of Micrometer Reading with the "Lustro-Chrome" MICROMETER

MEASURE TO 1/10,000th

All graduations are well-defined black lines on dull chrome surface for easier and surer reading, even in poor light. Guaranteed accurate within one half of a ten thousandth of an inch.

Drop-forged model with chrome finished micrometer head, from $9.75 up. Ask for Micrometer Catalog Code GINWY

No. 901 C 0-1" Size with LOCK NUT and RATCHET and 10th vernier as shown Code GHAEF $15.50

This tool with TUNGSTEN CARBIDE tipped anvils $18.00 Code GHAEF-CA

**GEO. SCHERR CO., INC.**

200-T LAFAYETTE STREET • NEW YORK 12, N. Y.

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**CUTTING OIL CHART**

Contains money-saving data on:

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| Turning | Boring | Milling |
| Reaming | Broaching | Sawing |
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2 - WHICH CUTTING OIL TO USE on: - Steel and non-ferrous metals

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Sulphurized lubricants or Compounded lubricants with extreme pressure additives for all applications.

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*Heat-treated and Corrosion Resistant*

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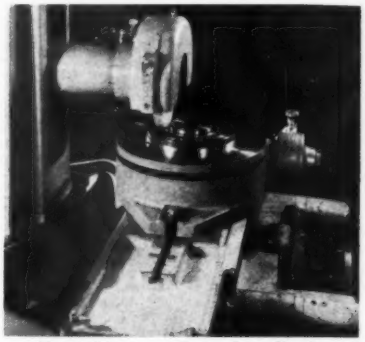
Telephone KEnwood 3 7799

CIRCLE INFORM-A-GRAM KEY NO. 2304


## TOOL SHOW PREVIEWS

- The new line of "Em-re" dial indicators will be introduced at Booth 910 by Petz-Emery Inc., of Pleasant Valley, N. Y. They're 100% shockproof with fully jeweled movements and combine high sensitivity, simple design, and rugged construction to provide accurate, repeated readings. When used in automatic processes the indicators can, in many cases, replace more expensive electronic or air gaging instruments. (S107)
- With the Vulcan rotary table only the cross feed of the surface grinder is used, reducing machine error and producing time saving precision or fine micro finishes on tool or production items. Available in 6" and 10"-



dia tables, and to be displayed at Booth 515 by Vulcan Tool Co., Dayton, Ohio, the units operate on regular air line sources. They can be used on a sine plate or angle fixture utilizing a standard surface grinder wheel. (S108)
- The Wesson group of companies (Ferndale, Brighton, and Lansing, Mich.; Lexington, Ky.) is planning to introduce to metalworking two completely new developments of major importance —one in the rotary tools field and one in the machine field—at the Booth 450. Both developments are just recently out of the testing stage and, while unrelated, both are expected to contribute toward sizeable reductions in overall tool cost on both single-point and multiple-point tools. (S109)


SEE the industrial line of

**GAERTNER MEASURING MICROSCOPES**

shown in the ad on page 216

**AT BOOTH 1126**

**ASTE INDUSTRIAL EXPOSITION**

Chicago, March 19-23

CIRCLE INFORM-A-GRAM KEY NO. 2305

THE INFORM-A-GRAM CARD ON PAGE 142.1 IS FOR YOUR CONVENIENCE IN MAKING INQUIRIES.

**PRESSURELOK-224**

*the best diamond wheel ever developed* for carbide tool grinding. Guaranteed ultimate cutting life from each diamond particle in every wheel.

UNITED STATES DIAMOND WHEEL CO.
1833 ILLINOIS AVE. AURORA, ILL.

IMMEDIATE DELIVERY on all wheel sizes, STRAIGHT, DISH, CUP, FLARE and MOUNTED WHEELS; HONES.

CIRCLE INFORM-A-GRAM KEY NO. 2311

**LASSY WORK HOLDERS**

Quick, accurate setups on lathes, jig borers, milling machines, grinders and drill presses. Normalized and accurate to .0005 in 3 inches. Hold round or odd shapes. Quick acting cam-lock swing clamp for fast loading—positive holding. Complete line of standard accessories includes jaws and clamps for multiple holding and also for use as drill jig. Made in 4 models—capacity to 4 inches. Write for complete descriptive literature.

LASSY TOOL CO., Plainville, Conn.
Makers of Lassy Tappers

Production setups with repetitive accuracy

CIRCLE INFORM-A-GRAM KEY NO. 2313

**NORDEX**

**Power Cutter For Plate And Sheet Metal Working**

The Safe Multi-Purpose Cutting Machine

For:
- BEADING
- FOLDING
- SLOT CUTTING
- STRAIGHT CUTTING
- CIRCLE CUTTING
- LOUVER CUTTING

Write To Manufacturer For Details

NORD CORPORATION 185 SPRUCE STREET NUTLEY, NEW JERSEY

CIRCLE INFORM-A-GRAM KEY NO. 2312

**STANDARD FLUSH PIN GAGES**

Precision Built
of Precision Ground
Oil Hardened
Tool Steel

Can be Furnished with Indicator Mountings
Completely Ground to Your Specifications and Ready for Use
No Design Necessary
Deliverable from Stock

Write for Latest Catalog as well as our Automatic Free Service.
Representatives Wanted for Most Industrial Areas

UNION GAGE CORP.
711 Lehigh Avenue Tel. Murdock 6-9150 UNION, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 2314

## Newly Designed Hydraulic-Feed Drilling Machine

A new line of standard vertical universal-joint drive, hydraulic-feed drilling machines has been designed that will enable the manufacturer to give his customers a more complete choice of drilling equipment.

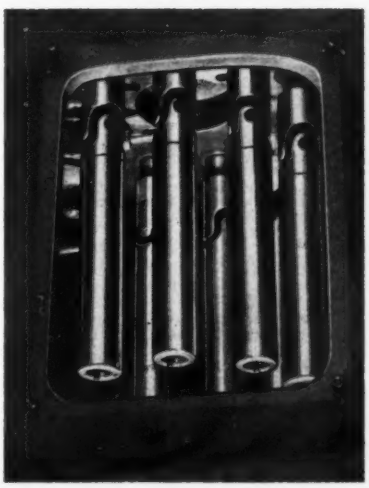
Chief features of this new Buhr line, built by Buhr Machine Tool Co. of Ann Arbor, Michigan, include 100% J.I.C. electrical and hydraulic standards which provide for full use of horsepower of the spindle-drive motor, while a separate motor is employed to drive the hydraulic power unit. Other features include hardened-and-ground steel ways, and automatic lubrication of all moving parts.

The three basic models vary in ways' width, stroke, and horsepower from 12" wide ways, 16" stroke, and 7½ hp to 24" ways, 24" stroke, and 20 hp.

Each basic model is built with a variety of head sizes and spindle drive arrangements in order to accommodate the widest possible use in medium and heavy duty operations.

Wide range of spindle speeds is available through a speed selector and pick-off gears in the main gear box. In addition, each spindle drive is equipped with an independent high-and-low speed change. Infinite feed range and various cycling sequences are attained by hydraulic feed. Thus, innumerable speed and feed combinations may be easily achieved by these Buhr standard drilling machines.

**Fig. 2. Detail of the upper-joint spindle-drives on Buhr's new line of standard drilling machines is shown.**



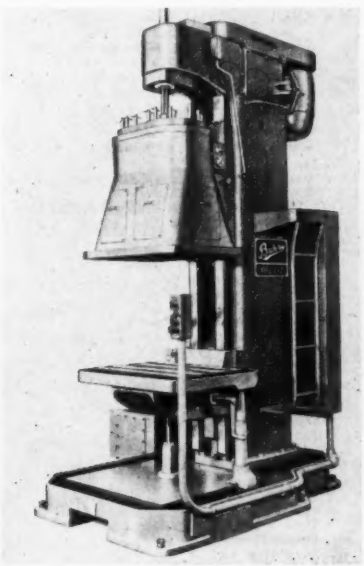


**Fig. 1. Smallest of the three basic models in Buhr's new line of standard adjustable-spindle drilling machines, is the VHU-1-12. This particular model has 12"-wide ways, 16" stroke and 7½ hp.**

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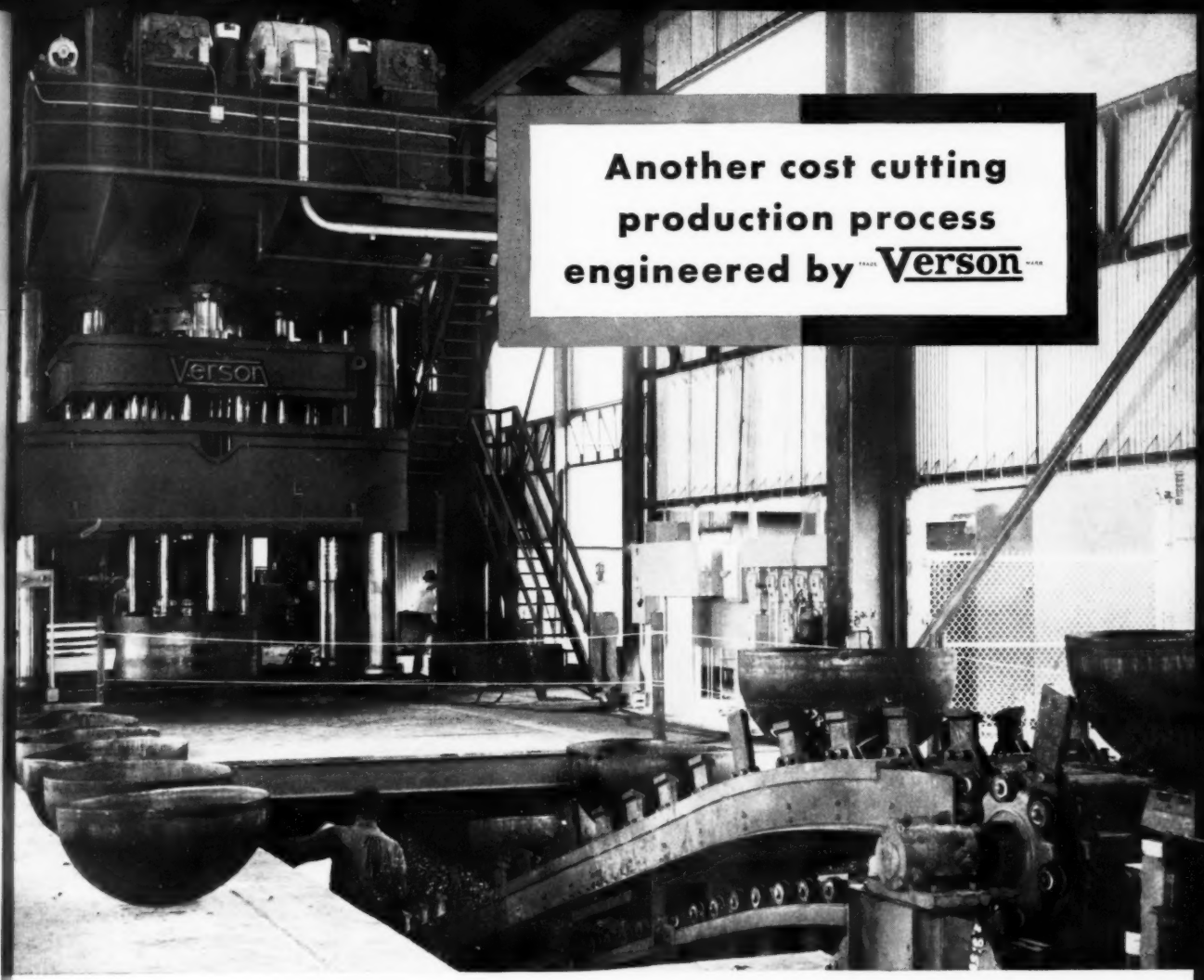


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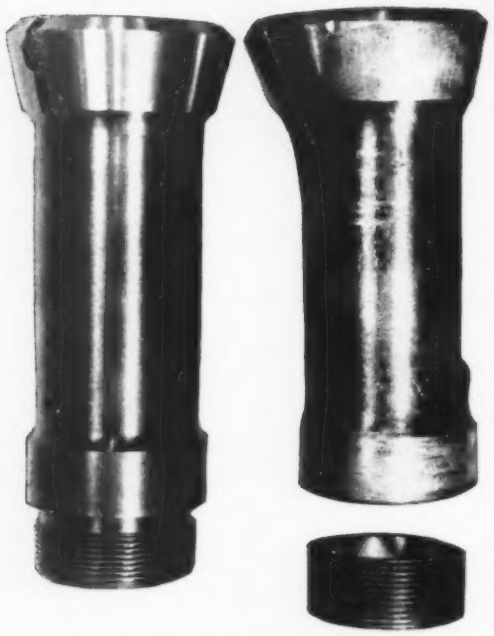

At right is a collet from a 1" machine. Note the threads are twisted off. Think about the trouble this caused besides the loss of time and production.

This will not happen to the Benco Collet shown at left. It's correctly engineered and carefully made. Remember Benco Collets are guaranteed against breakage for one year.

**will not break off at the threads**

**will not run out more than .001 per inch**

**or your money back**

Tests prove that the unique design of Benco Collets and our specialized manufacturing processes prevent two most common causes of collet trouble. Benco Collets are guaranteed against breakage for one year.

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